



**DV-7000/DV-8000 Series
Heli-Flow[®] Pump**

Owner's Manual

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1 Introduction

Overview

The DV-7000 Series and DV-8000 Series Heli-Flow Pumps are rotary, positive displacement auger valves. Each valve has a closed-loop, servo-controlled motor with encoder feedback that can reverse to create a clean fluid cutoff. The DV-7000/DV-8000 pumps are designed and exclusively manufactured by Asymtek to meet high-volume production requirements.



NOTE The terms pump and valve are synonymous in this manual.

DV-7000

The DV-7000 (Figure 1-1) can be used as a floating head pump for dispensing dots, or as a standard pump for dispensing lines and/or patterns. The DV-7000 is available in a luer- or footed-needle design with interchangeable cartridges, allowing the pump to work with several different fluid types. The DV-7000 has a hardened auger for use with filled epoxy materials and features a high flow rate.

Dispensing Systems

- X-1010 Axiom™ SMT Dispensing System
- M-2010 Millennium® Ultra High Speed SMT Dispensing System
- C-718 Century® Precision SMT Dispensing System
- D-550 DispenseMate® Series Dispensing System
- S-820 Spectrum® Precision Batch Dispensing System

DV-7000 Configurations

Table 1-1 identifies all currently available standard configurations for the DV-7000 Series pump. Contact Asymtek or your local distributor for other configurations that may better suit your application.

Table 1-1 DV-7000 Standard Configurations

Model	Description	Applications
DV-7222-SF1	Footed needle cartridge	Surface Mount Adhesive, Solder Paste, Silver Epoxy
DV-7222-SL1	Luer-lock needle cartridge	Surface Mount Adhesive, Solder Paste, Silver Epoxy
DV-7223-CP-SLP	Luer-lock needle cartridge	Silver Epoxy, Types 3 and 4 Solder Pastes
DV-7223-CP-OLP	Luer-lock needle cartridge	Types 5 and 6 Solder Pastes
DV-7321-CL8	Luer-lock needle cartridge	Dam Writing
DV-7322-CL8	Luer-lock needle cartridge	Glob Top, Encapsulation
DV-7331-CL8	Luer-lock needle cartridge	Lid Seal

DV-7000 Specifications

Table 1-2 DV-7000 Specifications

Dimensions	Length: 190-192 mm (7.48 - 7.56 inch) Width: 33 mm (1.3 inch) Depth: 72.6 mm (2.86 inch)
Air Pressure	34-552 kPA (5-80 psi, 0.7 - 5.5 bar) Depending on the fluid, higher viscosities require higher pressures
Motor	Closed-loop control with encoder feedback on the dispensing platform

DV-7000 Features

The DV-7000 (Figure 1-1) is designed with the following key features:

- Footed cartridge with a fixed mechanical stand-off nozzle for extremely consistent dots and increased throughput
- Luer-cartridge option allows use with a wide range of standard needles
- Tool-free disassembly of wetted parts for quick and easy cleaning
- Fast cartridge changeover
- Cartridges are interchangeable with DV-8000 pumps
- Closed-loop motor control with encoder feedback ensures high repeatability and precision dispense control

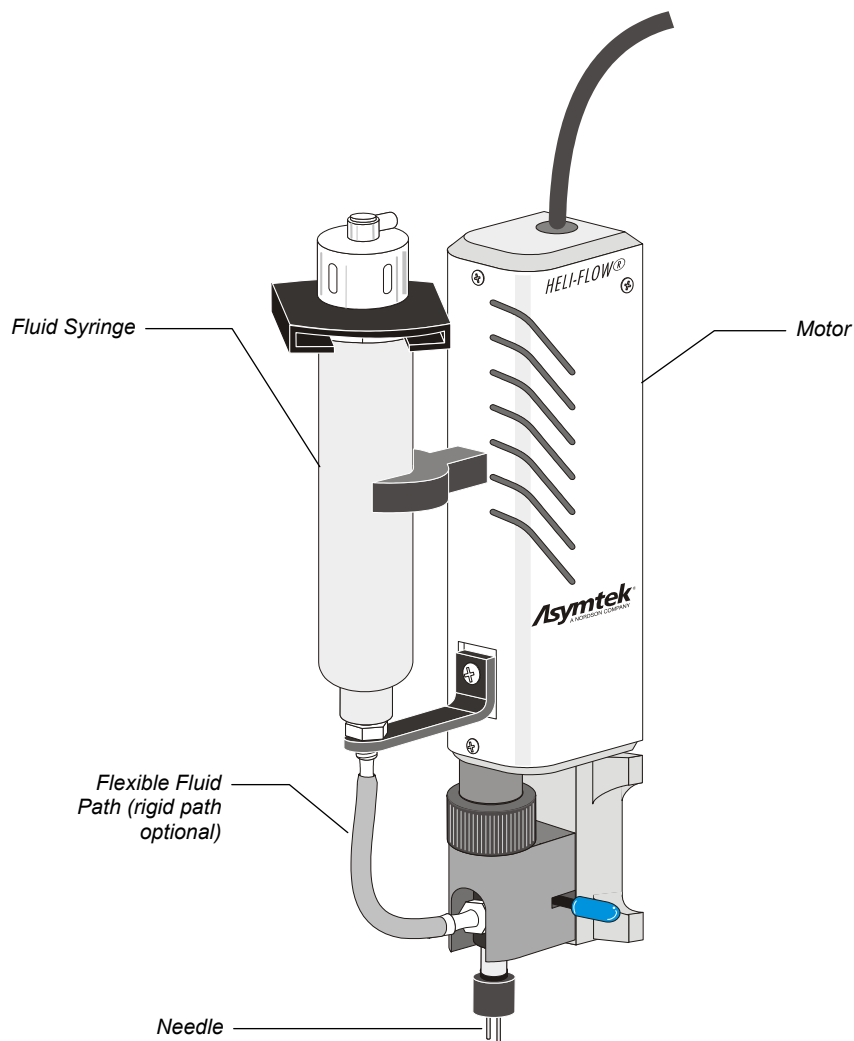


Figure 1-1 DV-7000 (DV-7222-SF1 shown)

DV-8000

The DV-8000 Heli-Flow® pump (Figure 1-2) features interchangeable cartridges for use in high flow rate encapsulation and lid seal applications, allowing each pump to work with several different fluid types. The DV-8000 has a fixed head design for use with high-viscosity fluids and high flow rate for fast dam writing. Typical applications for the DV-8000 include thermal grease, silver epoxy, and lid seal and dam materials.

Dispensing Systems

- X-1020 Axiom™ Dispensing System
- M-2020 Millennium® Ultra High Speed Dispensing System
- S-820 Spectrum® Precision Batch Dispensing System
- D-550 DispenseMate® Series Dispensing System

DV-8000 Series Configurations

Table 1-3 identifies all currently available standard configurations for the DV-8000 Series pump. Contact Asymtek or your local distributor for other configurations that may better suit your application.

Table 1-3 DV-8000 Standard Configurations

Model	Description	Applications
DV-8222 16-pitch carbide	2.5 mm diameter feedscrew	Small dots on DV-8000 pumps; low flow rate
DV-8322 16-pitch carbide	3.5 mm diameter feedscrew	Encapsulants
DV-8321 8-pitch carbide	3.5 mm diameter feedscrew	General purpose encapsulation
DV-8331 8-pitch carbide	3.5 mm diameter feedscrew	High flow rates
DV-8442 16-pitch carbide	4.5 mm diameter feedscrew	Highest flow rate, for high flow rate dams and lid seal

Table 1-4 DV-8000 Specifications

Dimensions	Length: 190-192 mm (7.48 - 7.56 inch) Width: 33 mm (1.3 inch) Depth: 72.6 mm (2.86 inch)
Air Pressure	34-552 kPA (5-80 psi, 0.7 - 5.5 bar) Depending on the fluid, higher viscosities require higher pressures
Motor	Closed-loop control with encoder feedback on the dispensing platform
Flow Rate Range	Flow rate depends on fluid, needle, valve speed, and syringe pressure Minimum volume displacement allows pump to dispense dots smaller than 0.5 mm in diameter Maximum flow rate capability for damming material is well over 100 mg/s (viscosity 1 M centipoises, specific gravity 1.76)

DV-8000 Series Features

The DV-8000 is designed with the following key features:

- Ideal for high-speed dams and lines of encapsulants, silver epoxy, lid seal, and thermal grease
- Tool-free disassembly of wetted parts for quick and easy cleaning
- Fast cartridge changeover
- Cartridges are interchangeable with DV-7000 pumps
- Closed-loop motor control with encoder feedback ensures high repeatability and precision dispense control
- Long-life carbide cartridges
- Powerful 11-watt motor and two gear box options (19:1 standard and 4:1 for high flow applications) are designed for use with thick fluids

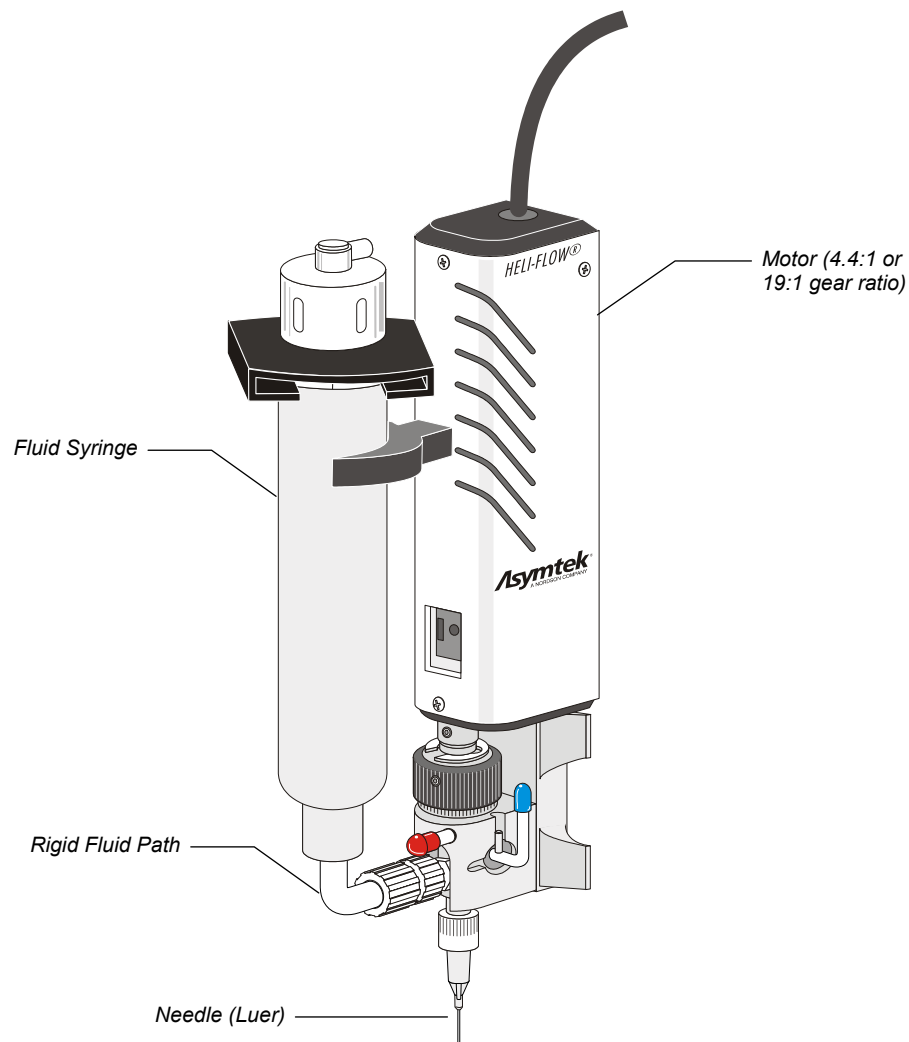


Figure 1-2 DV-8000 (DV-8222-CL1 shown)

2 Safety

Overview

This section describes the precautions to be taken to promote safety of personnel and prevent unnecessary damage to your DV-7000 or DV-8000 Series Heli-Flow Pump and valuable workpieces.



WARNING!



CAUTION!

Unsafe equipment conditions can result in personal injury or property damage. Failure to properly operate and maintain the system in accordance with this manual may jeopardize the built-in safety features.



CAUTION!

The DV-7000 and DV-8000 pumps are precision instruments. Follow all precautions and use care when installing, operating, or performing maintenance/service. Failure to do so may cause damage to the pump. Only trained personnel should perform pump installation, operation, maintenance, and service.



NOTE

Safety is considered a joint responsibility between the original equipment manufacturer (Asymtek) and the end-user (owner). In addition to those recommended in this manual, safety precautions and practices should be in accordance with local laws and regulations.

Intended Use

The DV-7000 and DV-8000 pumps are intended for use as described in this manual. Using the pump for other purposes is not recommended. Some examples of pump misuse include:

- Using incompatible materials
- Making unauthorized modifications
- Removing or bypassing safety guards or interlocks
- Using incompatible or damaged parts
- Using unapproved auxiliary equipment
- Operating equipment in excess of maximum ratings



WARNING!

Unsafe equipment conditions can result in personal injury or property damage. Failure to adhere to safety warnings and precautions could result in serious bodily harm to the user.

Safety of Personnel

- Only trained personnel should be permitted to perform installation, operation, maintenance, and troubleshooting procedures on the DV-7000/DV-8000 Series pumps.
- Before performing maintenance or service on the DV-7000/DV-8000 pumps, position it at the front of the dispensing chamber. This will provide easy access to components and limit exposure to hazardous areas.
- Immediately push the red Emergency Machine Off (EMO) button on your dispensing system if personnel are in danger.
- Do not touch the moving parts while the dispensing system is operating.
- Remove the DV-7000/DV-8000 pump completely from the dispensing system and allow the heated parts to cool before cleaning or performing maintenance.
- Relieve pneumatic pressure before adjusting or servicing pressurized components.

Material Safety

- Follow Material Safety Data Sheet (MSDS) recommendations for the proper handling, cleanup, and disposal of hazardous materials.
- Know the MSDS recommendations for treatment of injury resulting from exposure to hazardous materials.
- When working with multiple fluids, refer to the MSDS to ensure the materials are compatible.

Preventing Equipment and Workpiece Damage

- Immediately push the EMO button on the dispensing system if the dispensing system, pump, or a workpiece is in danger of being damaged.
- Use standard Electrostatic Discharge (ESD) precautions when working near sensitive components. Always wear a grounding strap and connect it to the ESD ground before handling workpieces and equipment.
- Perform all recommended DV-7000/DV-8000 maintenance procedures at the suggested intervals.
- Immediately contain and clean up any caustic or conductive fluid spills as recommended in the material manufacturer's MSDS.
- If fluid gets into internal portions of the DV-7000/DV-8000, immediately contact Asymtek Technical Support.
- Use only replacement parts that are designed for use with the original equipment. See the [Parts Replacement](#) section for a list of available parts and part numbers.

3 Installation

Overview

This section includes DV-7000/DV-8000 installation instructions for the Century, Millennium M-2000, Axiom, Spectrum, and DispenseMate Series Dispensing Systems.



NOTE For more information, refer to the manual for your particular dispensing system.

This section covers the following topics:

- [Installing the Pump](#)
- [Software Configuration](#)
- [Installation Verification Test](#)

Installing the Pump

If your DV-7000/DV-8000 pump was factory installed, you do not need to perform this procedure. Proceed with “[Installing/Changing a Fluid Syringe](#)” in the [Operation](#) section.



NOTE The installation instructions below do not include installation of an upgrade kit. If the pump is installed on a system that requires an upgrade kit, contact Asymtek Technical Support for additional information.



WARNING!



CAUTION!

Before installing the pump, the dispensing system must be completely powered down. Lock out and tag out power to the dispensing system to prevent accidental restoration of power during pump installation. Refer to the manual for your particular dispensing system for instructions.



WARNING!

The procedures in this section should be performed by trained personnel only.

Tools and Materials Needed

- 2 mm Hex Key
- 3 mm Hex Key
- 4 mm Hex Key
- Phillips Head Screwdriver
- Valve bracket
- Height Sensor and Bracket (application dependent)



NOTE Prior to installation, use the software or dispensing system position controls to move the dispensing head to the front center of the dispensing area. Perform a service shutdown as specified in the applicable dispensing system manual. Remove any valve currently installed on the dispensing head. If the valve bracket installed is incompatible with the DV-7000/DV-8000, remove it and the Height Sensor (if present). Refer to the installation/removal procedures in the applicable valve manual if necessary.

Installation on Century Series Systems



NOTE Illustrations in this section show the DV-7000, but installation instructions also apply to DV-8000 Series pumps.

1. Use the position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown and lock out/tag out power to the dispensing system as specified in the applicable dispensing system manual.
3. Slide the valve into the valve bracket (Figure 3-1).
4. Use a 4 mm hex key to tighten the locking screw on the side of the valve bracket.
 - The valve should be tightly held by the bracket.

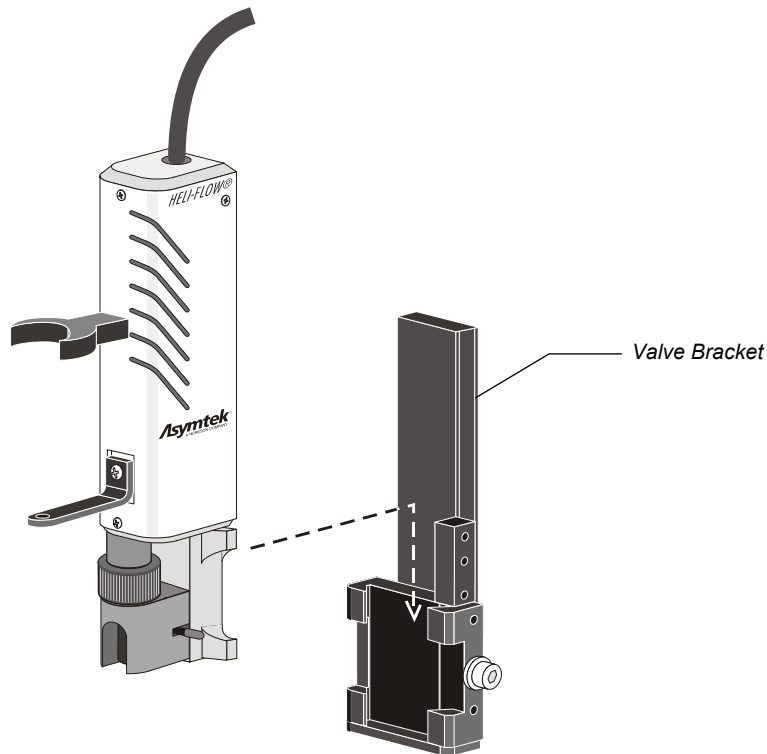


Figure 3-1 Attaching the Valve Bracket (Century Series System)



NOTE If you will be using a Height Sensor, proceed with Step 5. If not, skip to Step 7.

5. Use a 3 mm hex key to attach the height sensor bracket to the valve bracket (Figure 3-2).
6. Use a Phillips head screwdriver to attach the height sensor to the height sensor bracket (Figure 3-3).

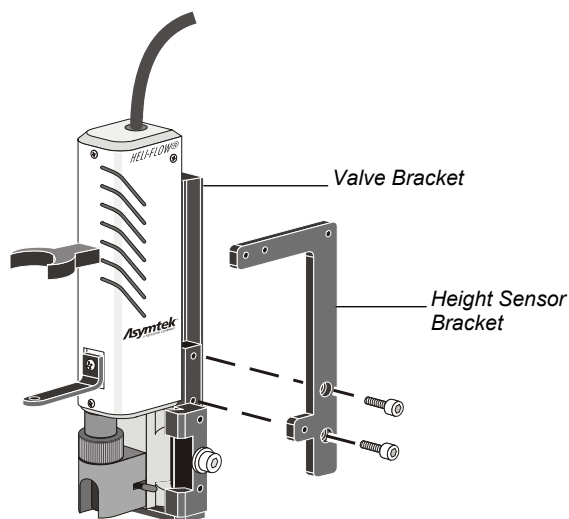


Figure 3-2 Attaching the Height Sensor Bracket

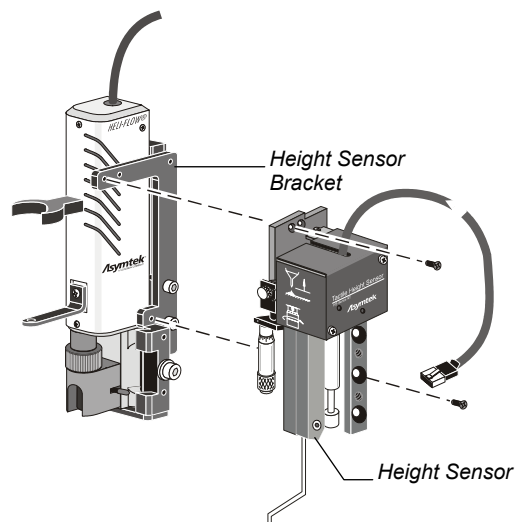


Figure 3-3 Attaching the Height Sensor (Century)

7. Slide the pump (with Height Sensor, if installed) into the valve mounting plate (Figure 3-4).
 - Position the valve bracket on the mounting plate so that when the pump is installed it will not collide with components when moving around the dispensing area.
8. While holding the valve bracket in place, use a 2 mm hex key to tighten the setscrews on the side of the valve mounting plate.
 - The valve bracket should be tightly held in the mounting plate.
9. Connect the pump power cord and Height Sensor power cord (if a Height Sensor is present) to the dispensing head bulkhead.

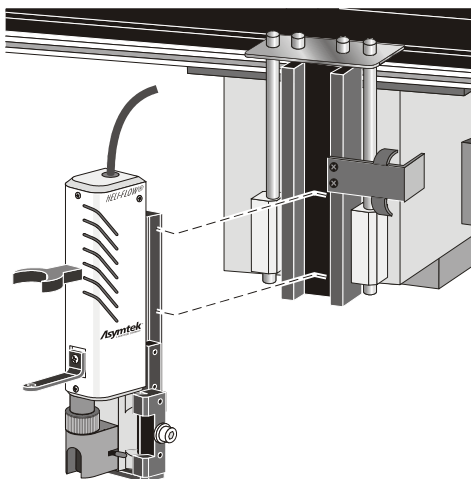


Figure 3-4 Mounting the Valve (Century)

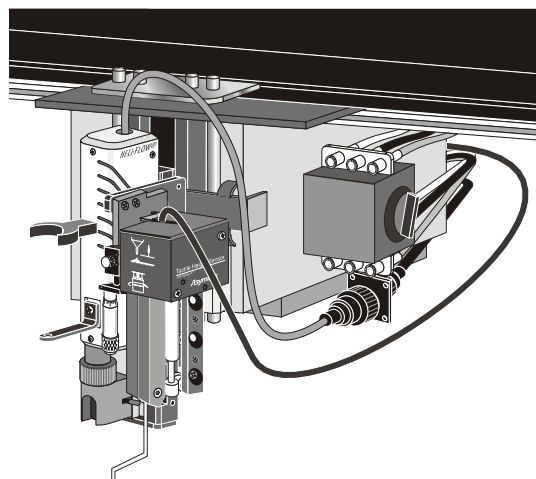


Figure 3-5 Valve Electrical Connections (Century)



NOTE Figure 3-5 shows connections on a typical Century System. For systems with a Dual-Action Dispensing Head, refer to the applicable manual.

10. Configure the Fluidmove software for the DV-7000/DV-8000 valve. See "[Software Configuration](#)" later in this section.

Installation on M-2000 Series or X-1000 Series Systems



NOTE Illustrations in this subsection show the DV-8000, but installation instructions also apply to DV-7000 Series Pumps.

1. Use the position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown and lock out/tag out power to the dispensing system as specified in the applicable dispensing system manual.
3. Use a 3 mm hex key to attach the valve bracket to the valve mounting plate (Figure 3-6).
 - Position the valve bracket on the mounting plate so that when the pump is installed it will not collide with components when moving around the dispensing area.

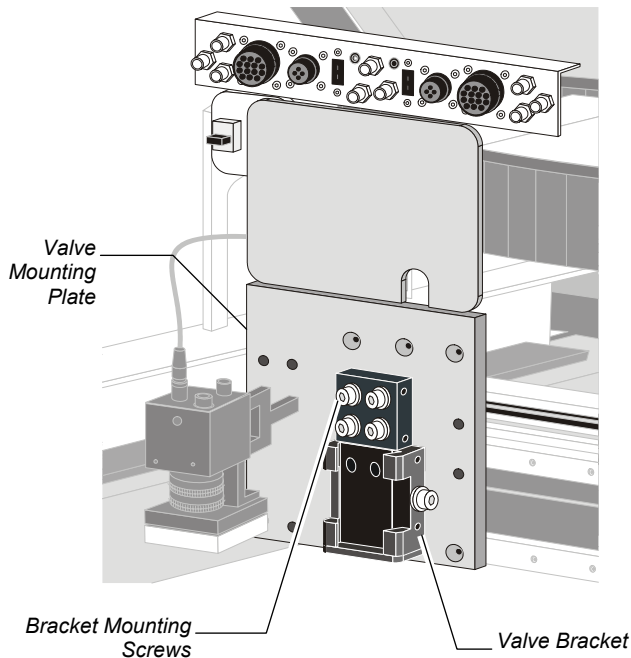


Figure 3-6 Attaching the Valve Bracket (M-2000 shown)

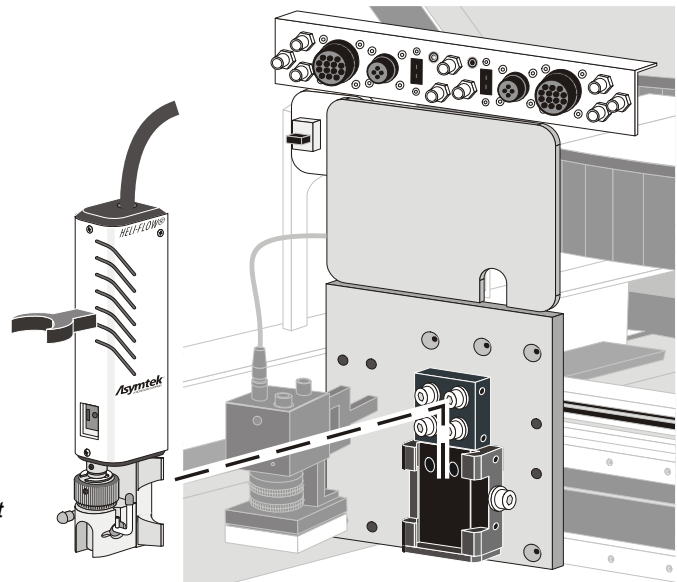


Figure 3-7 Mounting the Valve (M-2000 shown)

4. Slide the pump into the valve bracket (Figure 3-7).
5. Use a 4 mm hex key to tighten the locking screw on the side of the valve bracket.
 - The pump should be tightly held by the bracket.



NOTE If you will be using a height sensor, proceed with Step 6. If not, skip to Step 8.

6. Use a 3 mm hex key to attach the height sensor bracket to the valve bracket (Figure 3-8).
7. Use a Phillips head screwdriver to attach the height sensor to the height sensor bracket (Figure 3-9).

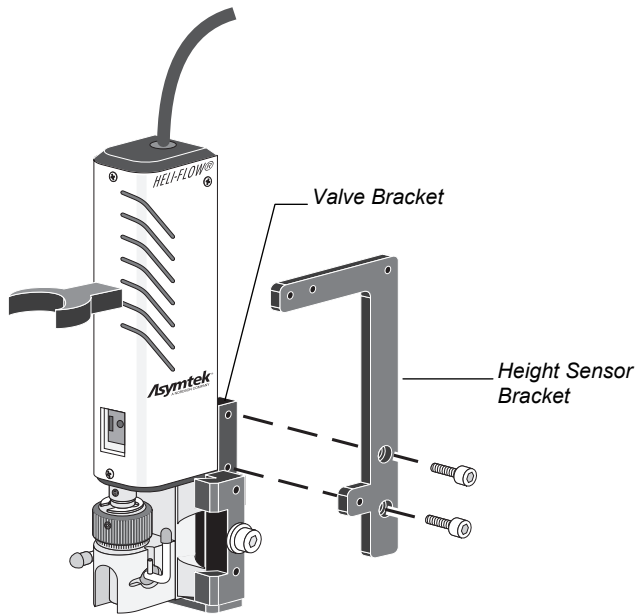


Figure 3-8 Attaching the Height Sensor Bracket (M-2000, X-1000 Systems)

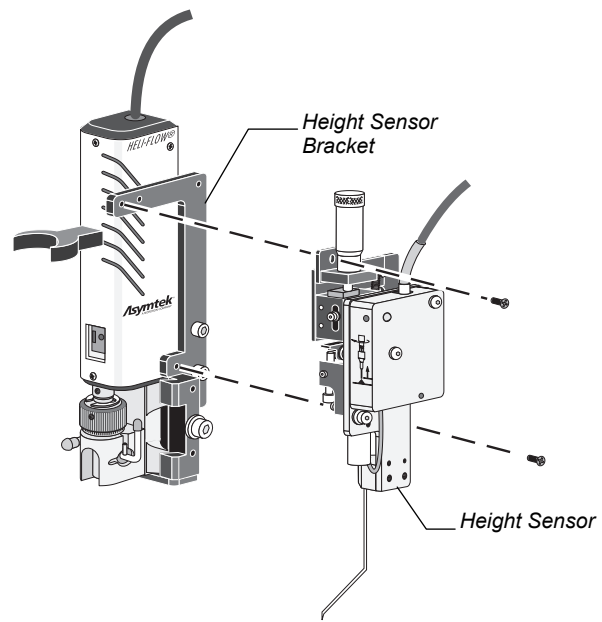


Figure 3-9 Attaching the Height Sensor (M-2000, X-1000 Systems)

8. Connect the pump power cord and height sensor power cord (if a height sensor is present) to the dispensing head bulkhead.



NOTE Location of the power connections depends on the dispensing system. Figure 3-10 and Figure 3-11 show typical connections on M-2000 and X-1000 dispensing systems. For systems with a Dual-Action Dispensing Head, refer to the applicable manual.

9. Configure the Fluidmove software for the DV-7000/DV-8000 valve. See "[Software Configuration](#)" later in this section.

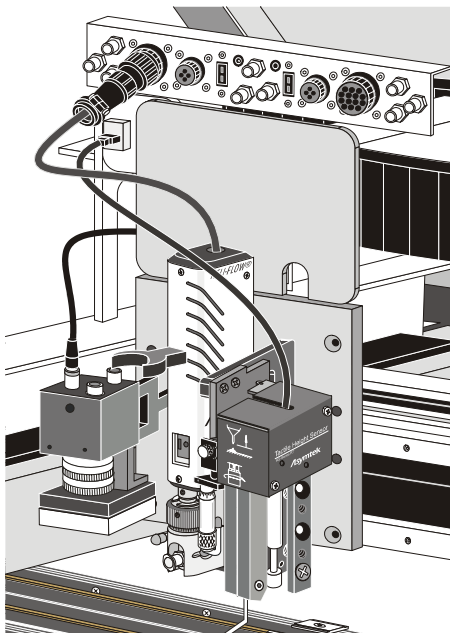


Figure 3-10 Valve Connections (M-2000)

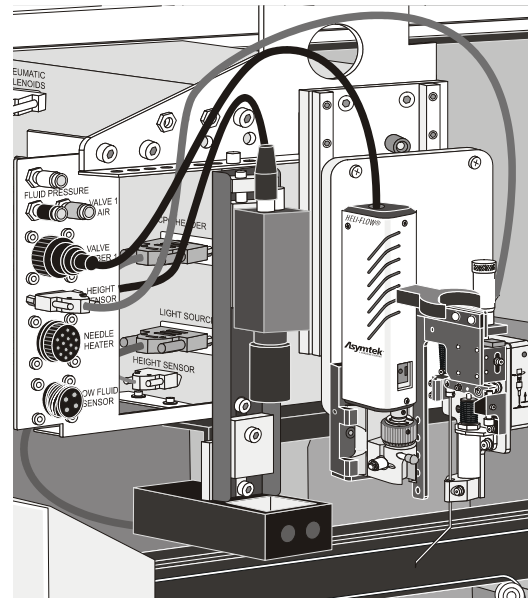


Figure 3-11 Valve Connections (X-1000)

Installation on Spectrum Series Dispensing Systems

1. Use the Fluidmove software position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown and lock out/tag out power to the dispensing system as specified in the applicable dispensing system manual.
3. Slide the dovetail bracket (included with the dispensing valve) into the valve mounting bracket on the Z-axis face plate.
4. Secure by turning the locking lever on the valve mounting bracket to the upward position (Figure 3-12).
5. Make valve electrical connections as shown in Figure 3-13. The syringe must be installed to connect the clear fluid line. See "[Installing a Syringe](#)" in the [Operation](#) section.
6. Configure the Fluidmove software for the DV-7000/DV-8000 valve. See "[Software Configuration](#)" later in this section.
7. After the valve has been installed, you must adjust the Height Sensor Probe. Refer to the manual for your particular dispensing system.

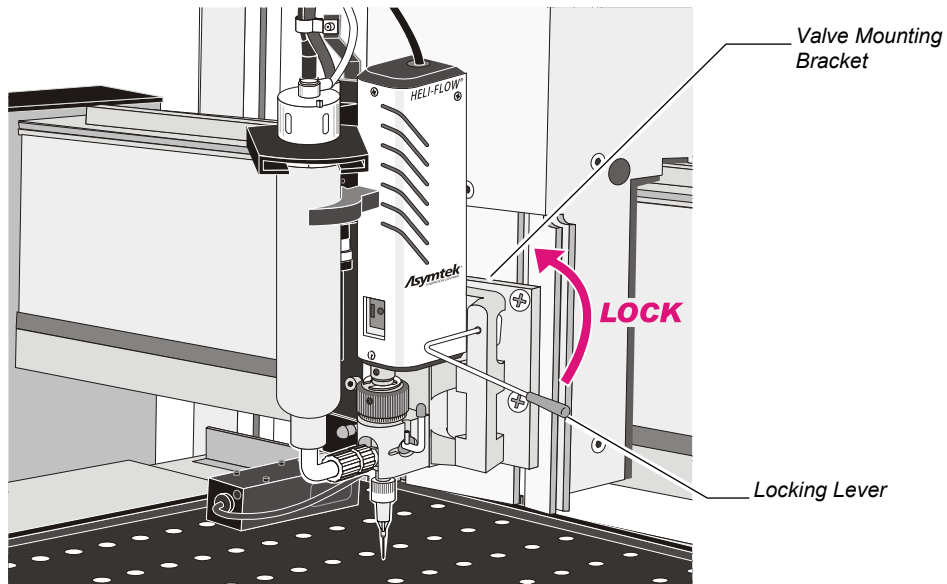


Figure 3-12 Installing the Valve (Spectrum)

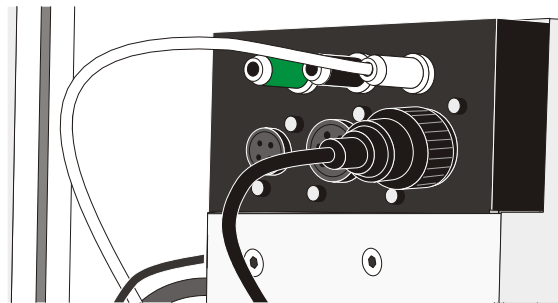


Figure 3-13 Valve Connections (Spectrum)

Installation on DispenseMate 550 Series Dispensing Systems

1. Use the Fluidmove software position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown and lock out/tag out power to the dispensing system as specified in the applicable dispensing system manual.
3. Loosen the six (6) screws on the Z-axis face plate (Figure 3-14A) and slide the face plate up so that it is flush with the Z-axis extrusion (Figure 3-14B). Tighten the screws on the face plate.
4. Slide the dovetail bracket (included with the valve) into the valve mounting bracket. Secure by tightening the socket head cap screw on the valve mounting bracket (Figure 3-14C).
5. Make electrical connections as shown in Figure 3-15. The syringe must be installed to connect the clear fluid line. See "[Installing a Syringe](#)" in the [Operation](#) section.
6. Configure the Fluidmove software for the DV-7000/DV-8000 valve. See "[Software Configuration](#)" later in this section.
7. After the valve has been installed, you must adjust the Height Sensor Probe. Refer to the *DispenseMate User Guide*.



NOTES When using the DV-7000 valve, make sure that the Valve Selector (U27) switch, located on the main board inside the electronics pan, is set to the proper position. The default setting is DV-8000. For detailed information, refer to the *DispenseMate User Guide*.

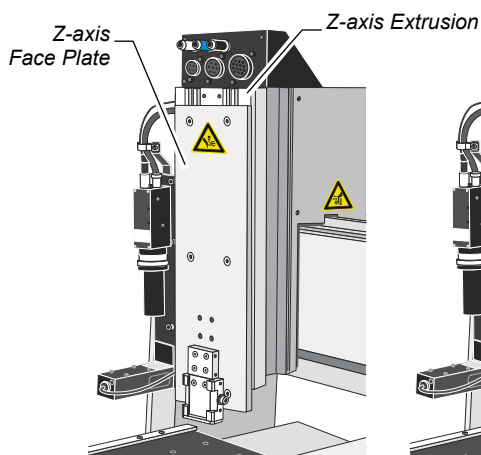


Figure A

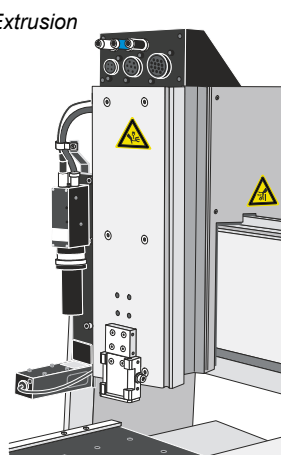


Figure B

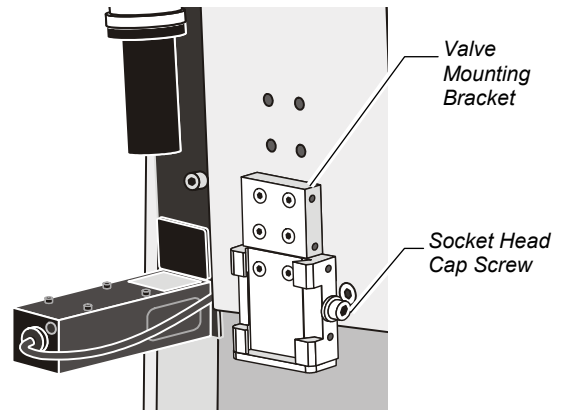


Figure C

Figure 3-14 Installing the Valve (DispenseMate)

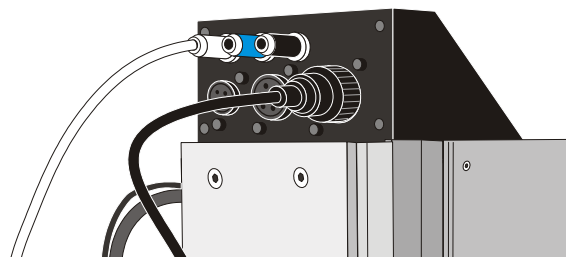
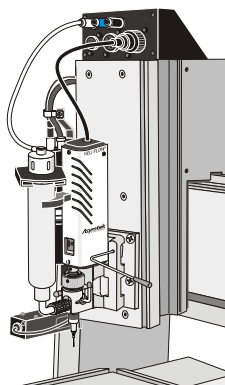


Figure 3-15 Valve Connections (DispenseMate)

Software Configuration

Once you have installed the pump on your dispensing system, the dispensing software must be configured.



WARNING! Only trained service technicians should perform this procedure.

1. Perform a system start-up as specified in the applicable dispensing system manual.
2. Start the Fluidmove software by double-clicking the **Fluidmove** icon  on the Windows desktop.
3. Select **Configuration > Setup Valves** from the Fluidmove Main Window.
 - ▶ The Setup Valves screen (Figure 3-16) opens.

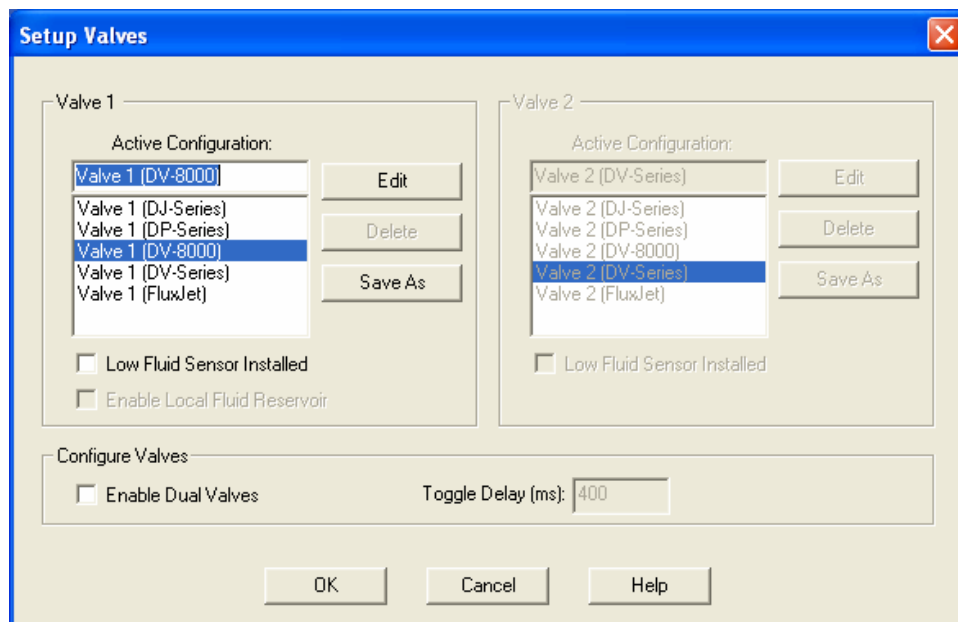


Figure 3-16 Fluidmove Setup Valves

4. Select DV-Series for the DV-7000 valve or DV-8000 for the DV-8000 valve from the Active Configuration list and click **OK**.



NOTE For dispensing systems with a Dual-Action Dispensing Head, make sure **Enable Dual Valves** is checked. You must configure the appropriate valve position (Valve 1 or Valve 2).

5. If the DV-7000/DV-8000 is equipped with a floating head, perform steps a through e. If not, skip to Step 6.



CAUTION!

Enabling this feature on a valve that is not equipped with a floating head could result in damage to the valve and to the workpiece.

- a. In the Setup Valves dialog box, click on **Edit** (Figure 3-16).
- b. In the Settings dialog box, click on the **Settings** tab and click on the radio button next to **Constant syringe pressure during dispensing** (Figure 3-17).
 - ▶ Activating this feature means that a constant supply of air pressure will be applied to the syringe as opposed to the air toggling ON and OFF as needed. A constant air supply can result in more a consistent dot size.
- c. Click on the **Floating Head** tab and click in the box next to **Enable Floating Head**. A checkmark in the box indicates the feature is enabled (Figure 3-17).
- d. Enter a value for the Floating Head Z Overtravel.
 - ▶ The “Floating Head Z Overtravel” is a Z-axis value that determines how far below the programmed dispensing height the dispensing head will travel in search of the substrate. This feature ensures a consistent dispensing height even if the workpiece is warped. The maximum value is 0.08-inch (2 mm). Typically, 0.04-inch (1 mm) is sufficient.
- e. Click on **OK** to accept the new settings and close the Settings dialog box.

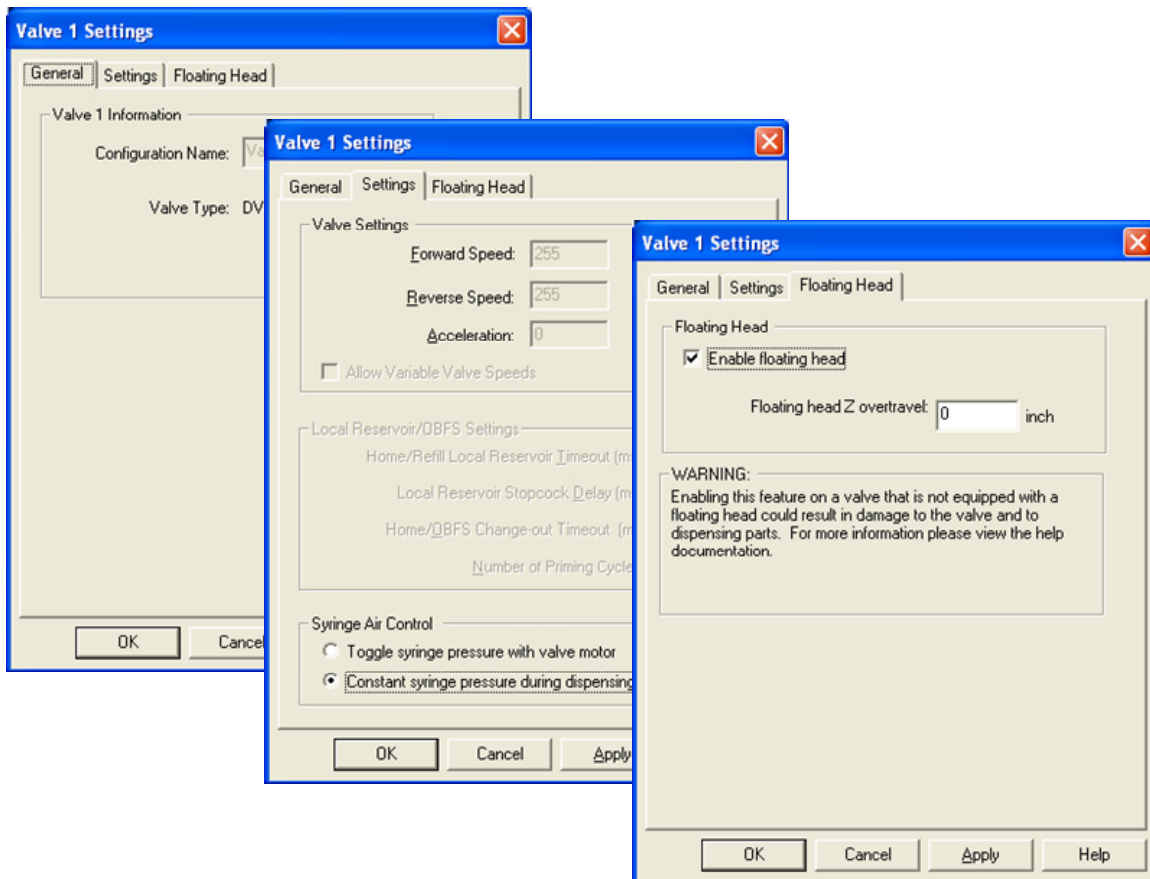


Figure 3-17 Enabling the Floating Head

6. In the Setup Valves dialog box, click on **OK**.
 - ▶ You will be prompted to restart Fluidmove.
7. Click on **Yes**
 - ▶ Fluidmove will restart and you will be prompted to run Valve Offsets.

Installation Verification Test

Once you have installed the pump on your dispensing system and configured the software, it is recommended that you perform this test to ensure that the pump accepts commands from your operating system and responds by moving the feedscrew in the correct direction.



WARNING! Only trained service technicians should perform this procedure.

1. Start Fluidmove.
2. In the Main Window, click on **Tools**.
3. In the Tools Window, click on **I/O Test** and then click on **Dispenser**.
4. In the Dispenser I/O Test dialog box, locate the **Valve Forward** output. See Figure 3-18.
 - ▶ The output name may be different on your system, but it should be similar enough to be easily identified.
 - ▶ On systems with Dual-Action Dispensing Heads, you will have to select Valve 1 (V1) or Valve 2 (V2) for I/O testing, as applicable.

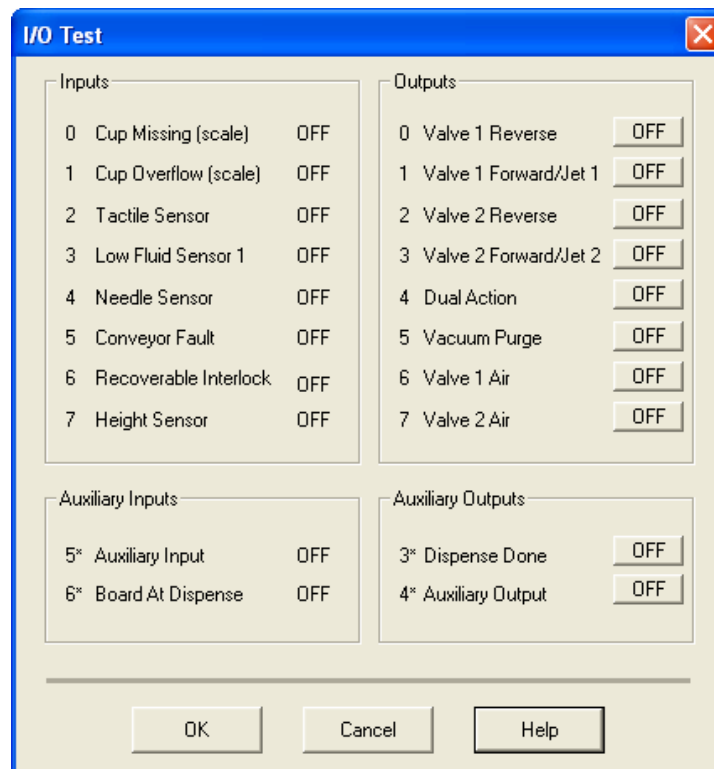


Figure 3-18 FmNT I/O Test Dialog Box (typical)

5. Toggle the output ON and check the direction of the ball coupling (Figure 3-19). It should be turning in a clockwise direction if viewed from above.
 - ▶ If the ball coupling is not turning, make sure that the pump power cord is properly connected. Then repeat this step.

6. Toggle the output OFF and make sure that the ball coupling stops turning.
7. In the Dispenser I/O Test dialog box, locate the **Valve Reverse** output. See Figure 3-18.
 - ▶ The output name may be different on your system, but it should be similar enough to be easily identified.
 - ▶ On systems with Dual-Action Dispensing Heads, you will have to select Valve 1 (V1) or Valve 2 (V2) for I/O testing, as applicable.
8. Toggle the output ON and check the direction of the ball coupling. It should be turning in a counterclockwise direction if viewed from above.
 - ▶ If the ball coupling is not turning, make sure that the pump power cord is properly connected. Then repeat this step.
9. Toggle the output OFF and make sure that the ball coupling stops turning.

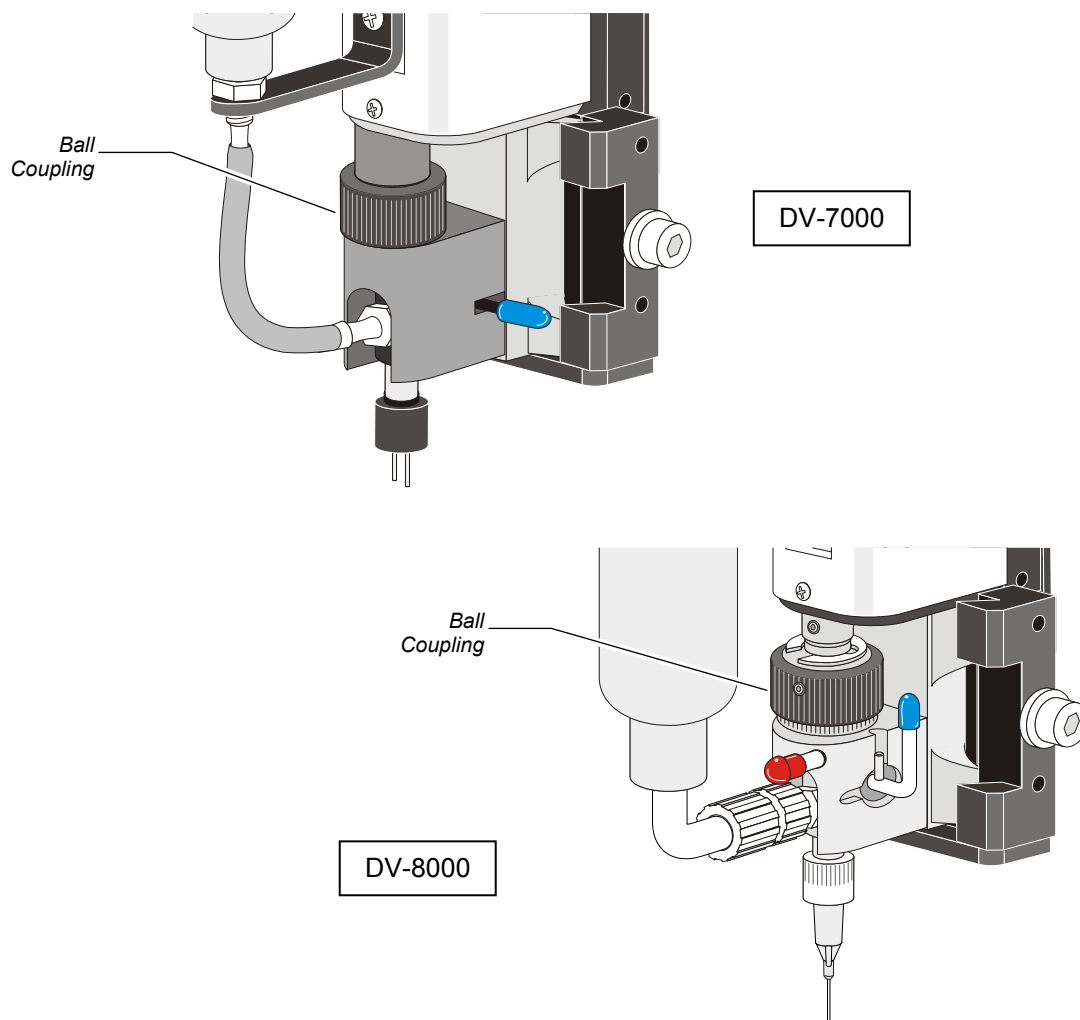


Figure 3-19 Ball Coupling Locations

4 Operation

Overview

This section covers the following topics:

- Theory of Operation
- Pump Adjustments
- Assembling a Dispensing Cartridge
- Loading a Dispensing Cartridge
- Installing/Changing a Fluid Syringe
- Priming the Pump
- Valve Offsets
- DV-7000 Optional Configuration

Theory of Operation

The DV-7000 and DV-8000 pumps use the following mode of operation:

1. Air pressure, which can be configured to remain constant or to toggle ON and OFF with the pump motor, causes fluid in a syringe to flow into contact with the pump feedscrew. The feedscrew is held in a cartridge.
2. The pump motor turns the feedscrew and shears the fluid.
3. The shear force drives fluid down the threads of the feedscrew and through the dispensing needle at the end of the cartridge.
4. Fluid is dispensed onto the workpiece.

The fluid viscosity (resistance to flow), size of the needle opening, geometry of the feedscrew, and the motor speed determine the quantity of fluid dispensed.

Pump Adjustments

You can optimize the performance of the pump by changing various settings, such as motor speed and air pressure. Software parameters can also be changed to meet your particular application requirements.



CAUTION!

Only trained service technicians should perform pump settings adjustments.

Motor Speed

Pump motor speed is a crucial factor in the dispensing process. Applications Engineers must consider dispensing system model, fluid properties, needle size, and substrate when determining the optimum pump speed for your application.

On systems with front control panels (M-600 Series, Century Series), or systems running FMW, manual speed controls control the speed of the pump motor. Refer to the manual for your particular dispensing system for help locating the speed controls.

On M-2000, X-1000, Spectrum, and DispenseMate Series systems and/or systems running FmNT/FmXP, speed control is integrated in the software. To locate the speed controls in Fluidmove, click on **Configuration > Setup Valves** in the Main Window. Click on **Edit** in the Setup Valves dialog box and select the **Settings** tab. Refer to the *Fluidmove User Guide* or Online Help for more information.

Air Pressure

Air pressure is used to move the material from the syringe to the feedscrew. The greater the pressure, the faster the material reaches the feedscrew. However, excessive air pressure can be detrimental to the dispensing process. Refer to the [Specifications](#) section for recommended air pressure settings.

Software Parameters

Refer to the *Fluidmove User Guide* or Online Help for detailed explanations of line and dot parameters.

Assembling a Dispensing Cartridge



CAUTION!

Only trained service technicians should perform this procedure.

Tools and Materials Needed

- 1/4-inch Wrench
 - Cartridge Kit
 - Dispensing Needle (application specific)
 - Seal Insertion Tool Set (P/N 197004)
1. Verify that all parts of the cartridge are clean. If not, clean in accordance with “[Cleaning the Pump](#)” in the [Maintenance and Service](#) section.
 2. Install the seal into the cartridge body as follows (see Figure 4-1):
 -  **NOTE** If the cartridge does not have a seal, skip to Step 3.
 - a. Place the seal, spring side up, onto the seal insertion tool.
 - b. Place the seal guide onto the cartridge body.
 - c. Press the seal into the cartridge body through the seal guide.
 - d. Remove the seal insertion tool and then the seal guide.
 - ▶ The seal should remain inside the cartridge body.
 3. Gently press the lower bearing down on top of the cartridge body (Figure 4-2).
 - ▶ This will seat the seal (if present) to the proper depth in the cartridge.
 4. Insert the feedscrew/thrust collar assembly into the top of the cartridge body until the thrust collar sits flush on top of the lower bearing.
 5. Install a needle of the appropriate size into the needle retainer and thread the retainer into the end of the cartridge body.
 - ▶ Do not over-tighten the needle retainer. Finger-tight is sufficient.
 6. Using a 1/4-inch wrench, install the cartridge fitting into the cartridge body.
 - ▶ Do not over-tighten the fitting or the plastic threads may strip.

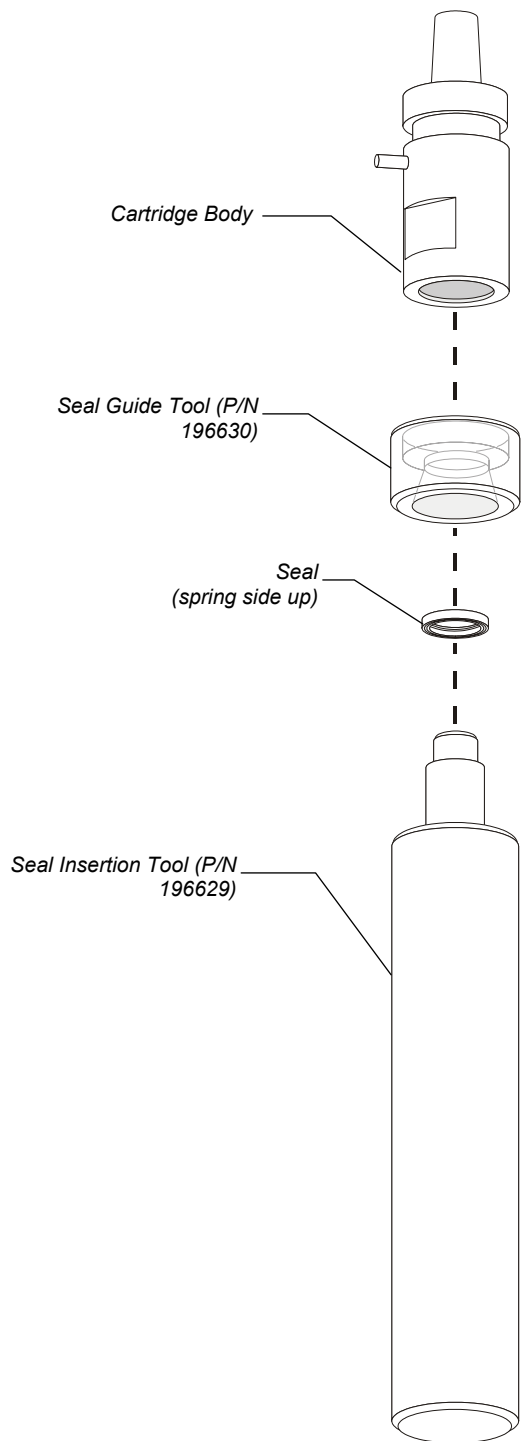


Figure 4-1 Installing a Cartridge Seal

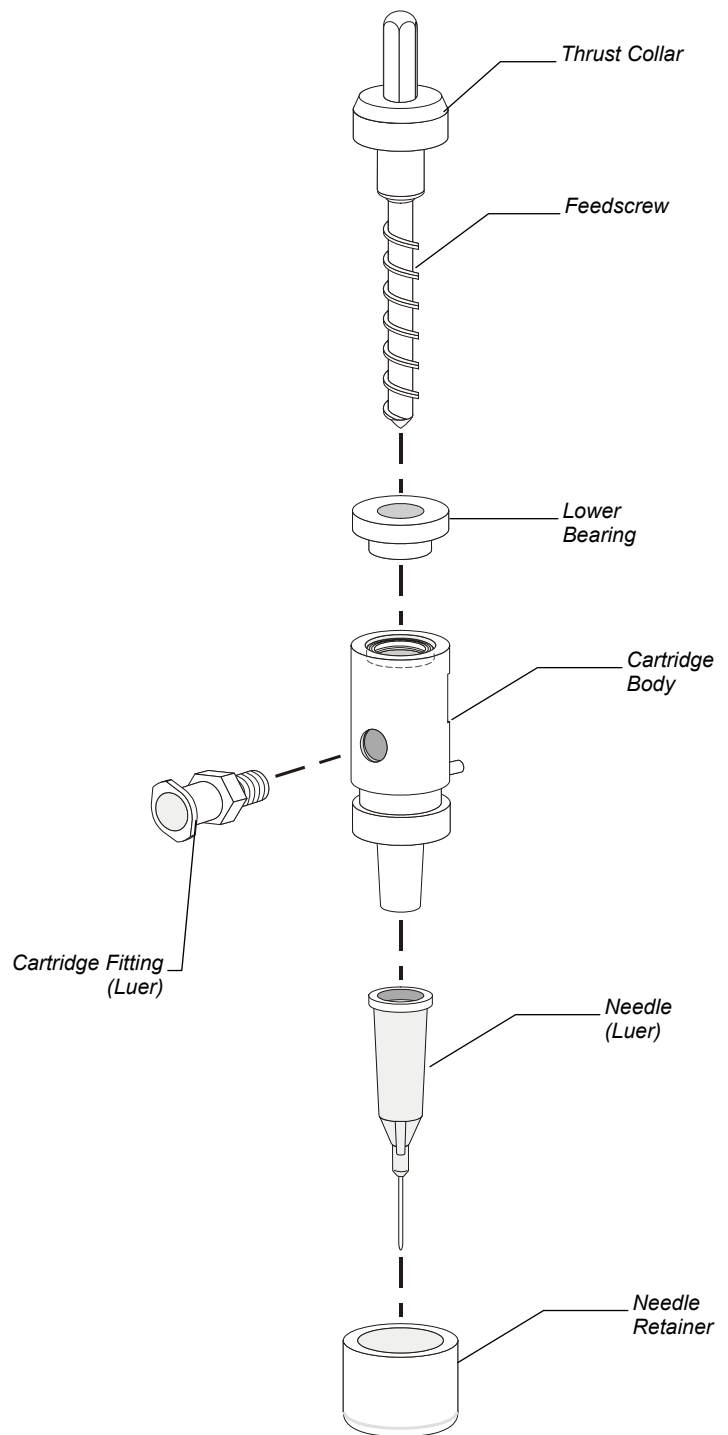


Figure 4-2 Dispensing Cartridge Exploded

Loading a Dispensing Cartridge

DV-7000



CAUTION!

Only trained service technicians should perform this procedure.



NOTE This procedure is for a pump already mounted on the dispensing head.

1. Use the position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a production shutdown as specified in the applicable dispensing system manual.
3. Open the dispensing system door or hatch, and locate the pump on the dispensing head.
4. Obtain the appropriate cartridge assembly for your application.
5. Push the cartridge into the valve body making sure to align the guide pin (Figure 4-3).
 - ▶ You will hear the cartridge release lever click as the cartridge snaps into place.
6. Install the fluid syringe, fittings, and feed tube as specified in [“Installing/Changing a Fluid Syringe”](#) later in this section.

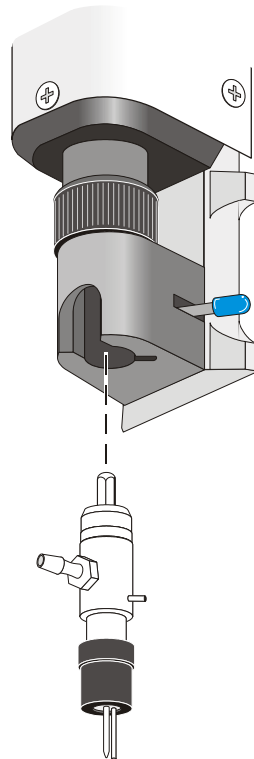


Figure 4-3 Cartridge Loading: DV-7000



CAUTION!

Only trained service technicians should perform this procedure.



NOTE This procedure is for a pump already mounted on the dispensing head.

1. Use the position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a production shutdown as specified in the applicable dispensing system manual.
3. Open the dispensing system door or hatch and locate the pump on the dispensing head.
4. Obtain the appropriate cartridge assembly for your application.
5. Push in the red clutch lock release and rotate the clutch cap to the right (counterclockwise) one complete turn (Figure 4-4).

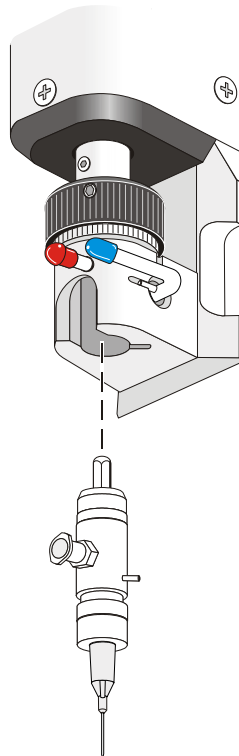


Figure 4-4 Cartridge Loading: DV-8000

6. Pull out the blue cartridge release lever and rotate it forward toward the front of the pump until it is in a horizontal position.
7. Insert the cartridge into the valve body making sure to align the guide pin with the slot.
8. While holding the cartridge in place, pull out the blue cartridge release lever and rotate it upward until it is in a vertical position.
 - This will lock the cartridge in place.

9. Apply the proper bearing preload by pressing the red clutch lock release while lightly rotating the clutch cap two or three times to the left (clockwise) until the clutch engages the cartridge. See Figure 4-5.
 - ▶ All that is needed to turn the clutch cap is a very light but even touch with your thumb and index finger. Do not apply radial pressure while turning the clutch cap or the friction on the threads will result in an improper preload setting. You will feel or hear a click when the clutch has reached its set preload.

**CAUTION!**

DO NOT remove or attempt to adjust the setscrews in the clutch cap or serious damage to the pump will result.

10. After the clutch has reached its set preload, verify that there is no axial movement between the cartridge and the valve body. See Figure 4-5. Reset preload if necessary.
11. Install the fluid syringe, fittings, and 90-degree elbow as specified in [“Installing/Changing a Fluid Syringe”](#) later in this section.

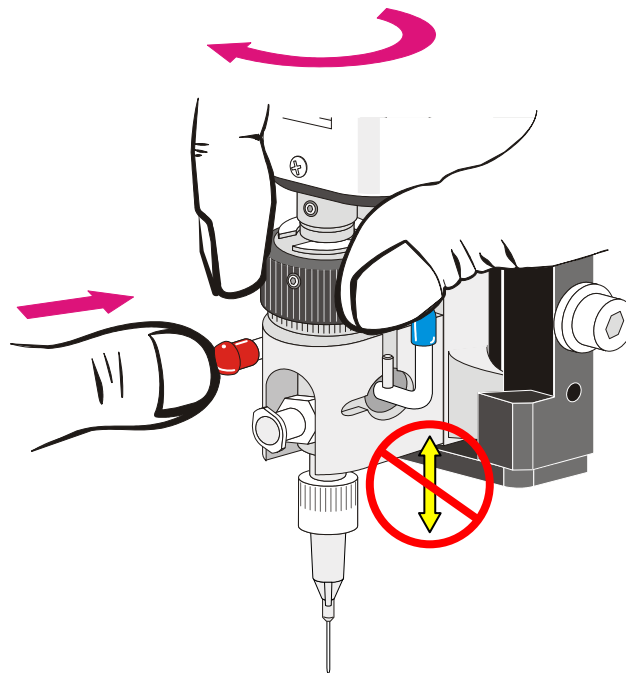


Figure 4-5 Setting the Bearing Preload

Installing/Changing a Fluid Syringe

Installing a Syringe of Conditioning Fluid (Solder Paste Applications Only)

When using the DV-7000/DV-8000 valve to dispense solder paste, you should install a syringe of conditioning fluid and prime the pump in between cleanings. See "[Solder Paste Applications](#)" later in this section. You may leave the conditioning fluid installed, until you are ready to install the syringe of solder paste.



WARNING!

Refer to the Material Safety Data Sheet (MSDS) for information on safety, handling, and disposal for all fluids and materials before use. All fluids and materials must be disposed of according to local regulations. Wear personal protective equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.

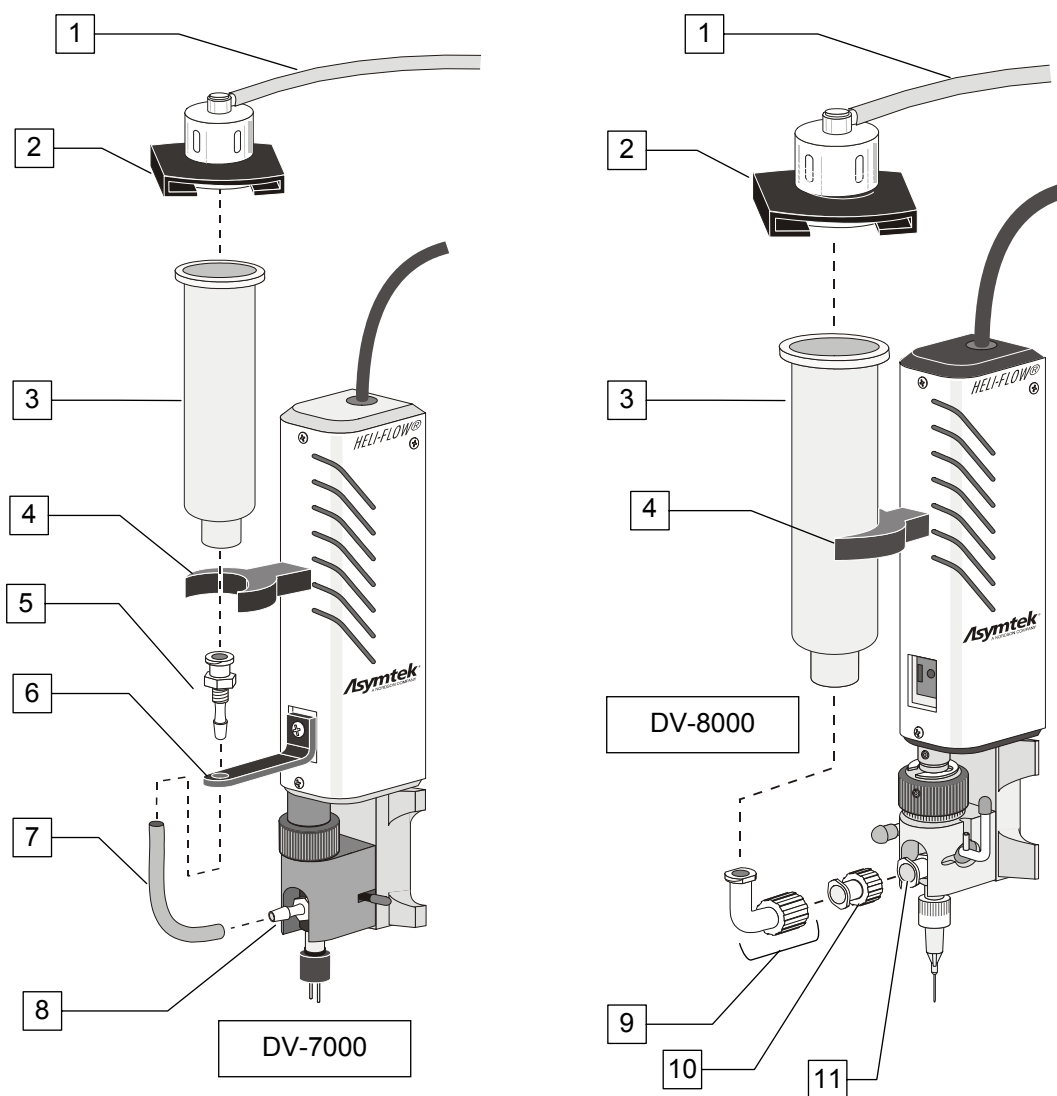


CAUTION!

Only trained service technicians should perform this procedure.

Tools and Materials Needed

- Syringe of Conditioning Fluid
 - Syringe Receiver Head and Air Hose
 - Personal Protective Equipment
 - Feed Tube and Fittings
1. Install the fittings and the feed tube on the pump as required by your application (Figure 4-6).
 - ▶ For most applications using the DV-7000, a flexible feed tube attaches to one barbed fitting threaded into the syringe bracket and another threaded into the dispensing cartridge.
 - ▶ For line and pattern applications using the optional configuration DV-7000, a rigid feed tube assembly threads into the syringe at one end (using a threaded Luer fitting) and the cartridge fitting at the other end. The syringe bracket is not installed.
 - ▶ For applications using the DV-8000, a rigid feed tube assembly threads into the syringe at one end (using a threaded Luer fitting) and the cartridge fitting at the other end.
 2. Obtain a syringe containing conditioning fluid and remove the cap from the end.
 3. Slide the syringe down through the syringe clip and screw it into the syringe fitting.
 4. Screw a clean receiver head onto the top of the syringe.
 5. Connect the syringe air hose to the receiver head and the blue **FLUID AIR** connector on the dispensing head bulkhead.
 6. Perform a dispensing system start-up as specified in the applicable dispensing system manual.
 7. Prime the pump. See "[Priming the Pump](#)" later in this section.



Item	Description
1	Syringe Air Hose (P/N 40-3510)
2	Receiver Head (P/N SA-603, SA-606, SA-610, or SA-635)
3	Syringe
4	Syringe Clip
5	Syringe Fitting (P/N 42-0229)
6	Syringe Bracket (P/N 02-0093-00, not used with rigid Feed Tube)
7	Flexible Feed Tube (42-0014)
8	Barbed Cartridge Fitting (P/N 42-0228)
9	Luer Elbow Assembly (P/N 63-0064-00)
10	Luer Adapter (P/N 42-0225)
11	Luer Cartridge Fitting (Luer – P/N 42-0028)

Figure 4-6 Installing/Changing a Syringe

Installing/Changing a Syringe of Production Fluid



WARNING!

Refer to the Material Safety Data Sheet (MSDS) for information on safety, handling, and disposal for all fluids and materials before use. All fluids and materials must be disposed of according to local regulations. Wear personal protective equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.



CAUTION!

Only trained service technicians should perform this procedure. When changing syringes, avoid introducing air into the fluid path. Air in the fluid path will adversely affect dispensing performance.

Tools and Materials Needed

- Clean Cloth and Solvent (for spills)
- 1/4-inch Wrench or Pliers (as needed)
- Syringe of Fluid to be Dispensed
- New Feed Tube and Fittings (if changing fluid)
- Appropriate Personal Protective Equipment



NOTE

If changing fluid types, you must first clean and prime the pump in accordance with “[Cleaning the Pump](#)” in the [Maintenance](#) section.

1. Use the position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a production shutdown as specified in the applicable dispensing system manual.
 - ▶ If there is no syringe installed, skip to Step 6.
3. Disconnect the syringe air hose from the **FLUID AIR** connector on the dispensing head bulkhead.
4. Remove the syringe receiver head from the empty syringe and unscrew the depleted syringe from its fitting.
 - ▶ If the fitting turns with the syringe, use a small wrench or pair of pliers (as applicable) to hold the fitting while unscrewing the syringe.
5. Remove the syringe and discard it in accordance with local regulations.
6. Obtain a new syringe and inspect the fluid for voids. If voids are present, obtain another syringe.
7. Remove the syringe cap and hold the syringe tip-side-down to allow the fluid to completely fill the syringe tip.
8. Slide the new syringe down through the syringe clip and screw it onto the syringe fitting.
 - ▶ There should be no fluid voids at the top of the syringe fitting. If any material seeps over the fitting, clean the fitting with a cloth and recommended solvent.
9. Screw the receiver head onto the top of the new syringe.
10. Connect the syringe air hose to the **FLUID AIR** connector on the dispensing head bulkhead.
11. Perform a dispensing system start-up as specified in the applicable dispensing system manual.

Priming the Pump

The purpose of priming is to initiate fluid flow into the pump and to eliminate any air in the fluid path. Priming is necessary after any of the following has occurred:

- Initial setup of the pump during installation
- Disassembly/cleaning of the dispensing cartridge and/or fittings
- Syringe Change

This subsection contains priming procedures for both solder paste and non-solder paste applications.



WARNING!

Refer to the Material Safety Data Sheet (MSDS) for information on safety, handling, and disposal for all fluids and materials before use. All fluids and materials must be disposed of according to local regulations. Wear personal protective equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.

Non-Solder Paste Applications

Tools and Materials Needed:

- Syringe of Production Fluid
- Plastic Purge Cup (P/N 58-0030)
- Dispensing Needle (application specific)
- Appropriate Personal Protective Equipment



CAUTION!

Only trained service technicians should perform this procedure.



NOTE

This procedure assumes that a clean dispensing cartridge and needle are installed. If not clean, refer to “[Cleaning the Pump](#)” in the [Maintenance](#) section.

1. Perform a dispensing system start-up as specified in the applicable dispensing system manual.
2. Use the position controls to move the dispensing head directly over the purge station.
3. Open the dispensing system door/hatch and perform the following:
 - a. Install a syringe of production-run fluid on the pump. Refer to “[Installing/Changing a Fluid Syringe](#)” earlier in this section.
 - b. Remove the purge station lid.
 - c. If the purge cup contains fluid, remove it and replace with a clean cup.
4. Close the dispensing system door/hatch.
5. In the Fluidmove Main Window, click on **Run a Program** (Figure 4-7).
 - ▶ Authorized personnel can also turn the Pump ON and OFF by going to **Tools>I/O Test>Dispenser** and toggling the Valve Forward output.
6. In the Production Window, click on **Setup** and then double click on **Valve-Forward/Reverse**.
7. In the Select Valve dialog box, select the valve you want to prime and click on **OK**.
 - ▶ On systems with Dual-Action Dispensing Heads, you will have to select Valve 1 (V1) or Valve 2 (V2), as applicable.

8. In the Valve Forward dialog box click the radio button next to **Forward** and enter a duration of 120 seconds (2 minutes).
 - ▶ The 120-second Valve Forward duration is an estimate of the time necessary for the production-run fluid to flow completely through the pump and be dispensed in a steady, unbroken stream. The preferred duration may vary.
 - ▶ Pump motor speed should be at your production-run setting.

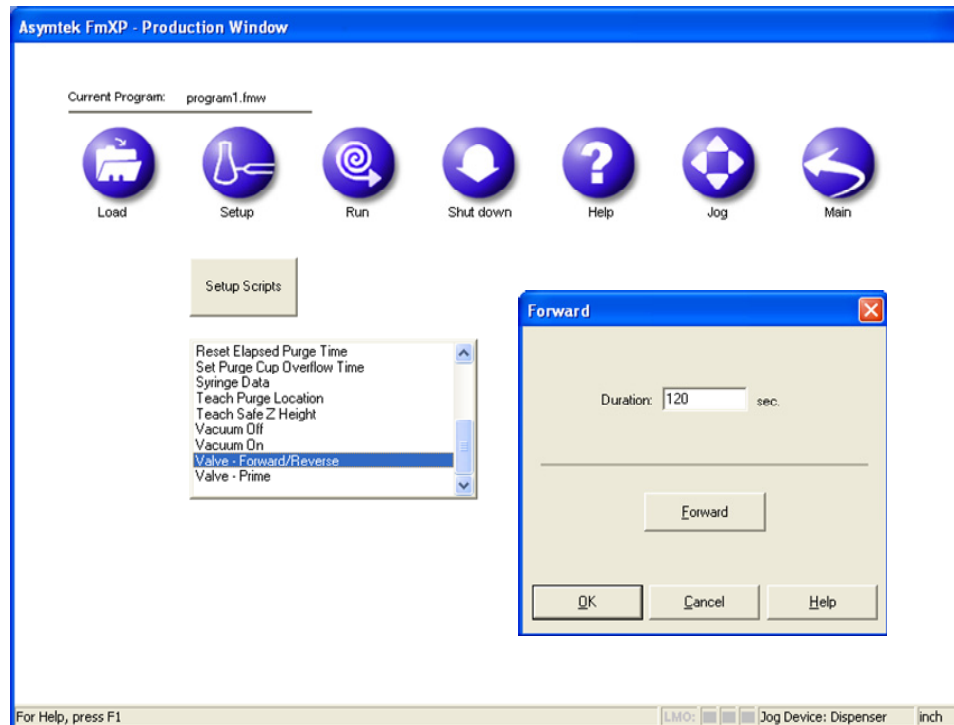


Figure 4-7 FmNT Valve Forward Screens

9. Click on the **Forward** button to start the pump.
10. After the pump has stopped, check for drooling.
 - ▶ “Drooling” means that fluid continues to drip from the tip of the needle when the pump is OFF. If drooling occurs, it means that there is air in the fluid path, or the system air pressure is set too high.
11. If there is no drooling present, proceed to Step 12. If the fluid is still drooling, repeat Steps 8 through 10 until no drooling occurs.
 - ▶ There should be no drooling of fluid from the needle after the pump has stopped. If drooling is persistent, refer to the [Troubleshooting](#) section.
12. Open the dispensing system door/hatch, replace the purge cup if necessary, and replace the purge station lid.

Solder Paste Applications

Solder Paste applications require a different priming procedure than non-solder paste applications because of the tendency of the paste to “cold weld” to the feedscrew. This cold welding increases feedscrew wear and affects dispensing performance.

Tools and Materials Needed

- Syringe of Solder Paste
- Syringe of Conditioning Fluid (KC-01)
- Dispensing Needle (application specific)
- Appropriate Personal Protective Equipment
- Plastic Purge Cup (P/N 58-0030)
- Clean Cloth with recommended Solvent



CAUTION!

Only trained service technicians should perform this procedure.



NOTE This procedure assumes that a clean dispensing cartridge and needle are installed. If not clean, refer to “[Cleaning the Pump](#)” in the [Maintenance](#) section.

1. Perform dispensing system start-up as specified in the applicable dispensing system manual.
2. Use the position controls to move the dispensing head directly over the purge station.
3. Open the dispensing system door/hatch and perform the following:
 - a. Install a syringe of conditioning fluid on the pump. See “[Installing/Changing a Fluid Syringe](#).”
 - b. Remove the Purge Station Lid. If the purge cup contains fluid, remove it and replace with a clean cup.
4. Close the dispensing system door/hatch.
5. In the Fluidmove Main Window, click on **Run a Program**.
 - ▶ The Fluidmove Production Window opens.



NOTE Authorized personnel can also turn the Pump ON and OFF by going to **Tools > I/O Test > Dispenser** and toggling the Valve Forward output.

6. In the Production Window, click on **Setup** and then double click on **Valve - Forward/Reverse** (Figure 4-7).



NOTE On systems with Dual-Action Dispensing Heads, you will have to select Valve 1 (V1) or Valve 2 (V2), as applicable.

7. In the Valve Forward dialog box click the radio button next to **Forward** and enter a duration of 60 seconds (1 minute).
 - ▶ The 60-second Valve Forward duration is an estimate of the time necessary for the conditioning fluid to flow completely through the pump and be dispensed in a steady, unbroken stream. The preferred duration may vary. Pump motor speed should be at your production-run setting.
8. Click on the **Forward** button to start the pump.
9. After the pump has stopped, check for drooling.
 - ▶ “Drooling” means that fluid continues to drip from the tip of the needle when the pump is OFF. Drooling occurs because there is air in the fluid path or the air pressure is too high.

10. If there is no drooling present, proceed to Step 11. If drooling persists, refer to the [Troubleshooting](#) section.
11. When drooling has stopped, open the dispensing system door/hatch, and perform the following:
 - a. Remove the syringe of conditioning fluid and install a syringe of solder paste.
 - b. Remove and set aside the needle from the dispensing cartridge.
 - c. If the purge cup is full, remove it and replace with a clean purge cup.
12. Close the dispensing system door/hatch.
13. Set the pump motor speed to a slow rate (0.5 to 1.0 for M-600 Series Systems, 100 for M-2000 Series Systems, 10 percent on X-1000 Series Systems) to prevent cold welding of the solder paste during the priming operation.
14. Set the Valve Forward duration to 180 to 300 seconds (3 to 5 minutes) and click on the **Forward** button to start the pump.
 - ▶ The Valve Forward duration above is an estimate of the time necessary for the solder paste to completely purge the conditioning fluid from the pump.
15. Repeat Step 15 as needed until you can see that all conditioning fluid has been purged into the purge cup.
 - ▶ There should be no drooling of solder paste from the pump after it has stopped.
16. Open the dispensing system door/hatch and clean any residual solder paste from the end of the cartridge using a clean cloth and manufacturer-recommended solvent.
17. Reinstall the needle removed in Step 12 and close the dispensing system door/hatch.
 - ▶ The needle should still be coated inside with conditioning fluid.
18. Set the Valve Forward duration to 60 seconds (1 minute) minimum and click on the **Forward** button to start the pump. Pump motor speed should still be at the slow rate set in Step 13.
 - ▶ The Valve Forward duration above is an estimate of the time necessary for the solder paste to flow through the needle and into the purge cup.
19. Reset the pump motor speed to the rate recommended for your dispensing application.
 - ▶ If the needle becomes plugged during the first few minutes of dispensing, do not clean the dispensing cartridge. Remove the needle and repeat Steps 14 through 19. Make sure the needle is clean before reattaching it.

Valve Offsets

A Valve Offsets routine in Fluidmove must be performed after any of the following:

- Initial Valve setup
- Valve change
- Height Sensor change or adjustment

This screen-prompted routine identifies and records a Safe Z-Height for dispensing head travel, the XYZ locations of the Purge Station and Weigh Station (if present), needle, and the substrate height. It also calibrates the Camera-to-Needle and Needle-to-Height Sensor Probe offsets, if these accessories are installed on the dispensing system. Refer to the *Fluidmove User Guide* or *Online Help* for additional information.

DV-7000 Optional Configuration

The optional configuration allows the DV-7000 to be used for dispensing lines and/or patterns. The optional configuration includes the following:

- Luer-compatible Dispensing Cartridge
- Stiffer Spring to stabilize the Floating Head
- Rigid Feed Tube Assembly

The special dispensing cartridge fits into the bottom of the pump in the exact same way as the standard dispensing cartridge. Operation and maintenance of the special dispensing cartridge is the same as for the standard dispensing cartridge.



NOTE This optional configuration may be available as a standard feature on the DV-7222-CL1, DV-7321-CL8, DV-7322-CL8, and DV-7331-CL8 models. Contact Asymtek for more information.

Tools and Materials Needed

- No-float Spring Kit (P/N 198537)
- Rigid Feed Tube Assembly (in Consumables Kit)
- Phillips-head Screwdriver
- Dispensing Cartridge (in Shipping Kit)

To convert the DV-7000 to optional configuration (see Figure 4-8):



WARNING!



CAUTION!

This procedure **MUST NOT** be performed while the pump is mounted on the dispensing head. Only trained service technicians should perform this procedure.

1. Perform a service shutdown as specified in the applicable dispensing system manual and remove the pump as specified in [“Removing the Pump from the Dispensing System”](#) in the [Maintenance](#) section.
2. If installed, remove the syringe bracket from the front of the pump.
3. Install the Luer adapter dispensing cartridge into the valve body as specified in [“Loading a Dispensing Cartridge”](#) earlier in this section.
4. Use the Phillips-head screwdriver to remove the two screws on the spring cover plate. Remove the currently installed spring from the back of the pump.
5. Insert the bottom of the No-float Spring (P/N 47-1312) into the back of the pump, compress the spring, and then slide the top of the spring into the slot.
6. Reinstall the spring cover plate and the two screws.
7. Install the pump onto the dispensing system. Refer to the [Installation](#) section, if necessary.

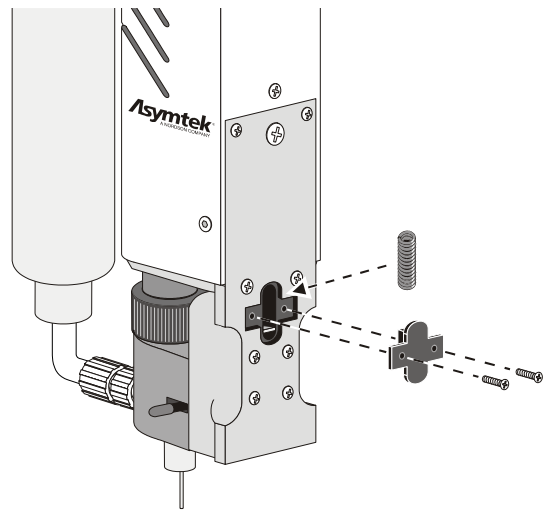


Figure 4-8 DV-7000 Optional Configuration

5 Maintenance and Service

Overview

Maintenance of the DV-7000/DV-8000 Heli-Flow Pumps consists of cleaning and priming after dispensing operations, or between changes of dispensing fluids. Regular cleaning of the pump is essential to maintaining maximum dispensing performance. This section covers the following topics:

- [Recordkeeping](#)
- [Calibration and Adjustment](#)
- [Parts Ordering Information](#)
- [Preventive Maintenance](#)
- [Cleaning the Pump](#)
- [Removing the Pump from the Dispensing System](#)
- [Pump Assembly and Disassembly](#)

Safety First

It is essential that you follow all safety warnings and consider all safety warning labels when performing the following maintenance procedures. Refer to the [Safety](#) section for specific information.



WARNING!

Before performing any of the maintenance procedures in this section, perform a service shutdown as described in the applicable dispensing system manual.



WARNING!

Maintenance procedures should be performed by trained personnel only.

Recordkeeping

The type of maintenance performed (such as preventive and parts replacement) should be recorded in maintenance records for the pump. Dates, part numbers/serial numbers of replaced parts, names of technicians, and other pertinent data should be recorded.

Calibration and Adjustment

There are no maintenance-related calibration and adjustment requirements for the pump. Before operating the pump, adjustments are made to dispensing system air pressure and pump motor speed as determined by your application.

Parts Ordering Information



NOTES Part numbers can be found in the illustrations and tables in the [Parts Replacement](#) section.

Make sure that the cartridge assembly part numbers match your pump's configuration number when ordering spare parts.

Preventive Maintenance

The recommended Preventive Maintenance schedule for DV-7000/DV-8000 pumps is shown in Table 5-1. The recommended frequencies are based on an average production environment. Your production operations and environment may differ.

Table 5-1 Recommended Maintenance Schedule

Maintenance Procedure	Recommended Frequency	Instructions
Clean the Dispensing Cartridge.	Daily	See “ Cleaning the Pump ” in this section.
Prime the fluid pump.	Daily	See “ Priming the Pump ” in the Operation section.
Inspect for fluid leakage and other abnormalities.	Daily	See the Troubleshooting section.

Cleaning the Pump



NOTE The cleaning procedures assume that a syringe is presently connected to the pump.



WARNING!

Refer to the Material Safety Data Sheet (MSDS) for important information about safety, handling, and disposal for all fluids and solvents. All fluids, solvents, and contaminated materials must be disposed of according to local regulations. Wear personal protective equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.

DV-7000

Tools and Materials Needed:

- Cotton Swabs
- 1/4-inch Wrench
- Cleaning Kit (P/N VK-7000K)
- Cartridge Fitting (P/N 42-0228)
- Syringe Fitting (P/N 42-0229)
- Appropriate Personal Protective Equipment
- Seal Insertion Tool Set (P/N 197004)
- Cleaning Solution (MSDS recommended)
- Feed Tube (P/N 42-0014)

To clean a DV-7000 Cartridge (see [Figure 5-1](#)):

1. Use the position controls to move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown as specified in the applicable dispensing system manual.
3. Open the dispensing system front doors/hatch and locate the pump on the dispensing head.
4. Disconnect the feed tube from the cartridge fitting.
5. Push the blue cartridge release lever back towards the valve bracket.
6. Pull the cartridge out of the pump by gently pulling down on the nozzle.
7. Using a 1/4-inch wrench, remove the cartridge fitting from the cartridge body.
8. Discard the cartridge fitting in accordance with MSDS recommendations.
9. While holding the cartridge body in one hand and the end of the feedscrew in the other, gently pull the feedscrew out of the cartridge.
 - The thrust collar should remain attached to the feedscrew.

10. Using your fingers, remove the lower bearing from inside of the cartridge body.
11. Using a cotton swab, carefully remove the seal from inside of the cartridge body.
 - The seal is very fragile. If the seal is not damaged, it may be reused.
12. While holding the cartridge body in one hand and the needle retainer in the other, gently twist the retainer to the left to remove it from the end of the cartridge.
13. Remove the needle from inside the needle retainer.

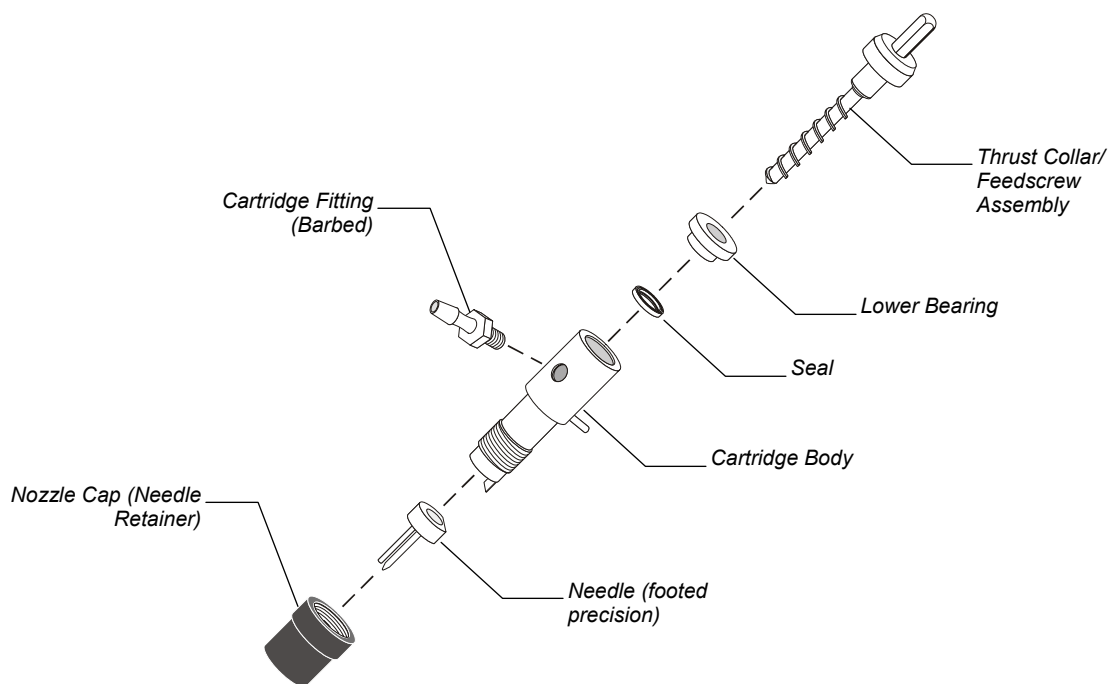


Figure 5-1 DV-7000 Cartridge Disassembly (typical)

14. Use MSDS recommended cleaning solution and a small bottle brush or cotton swab to thoroughly clean the following parts making sure all fluid and residue is removed:
 - Feedscrew
 - Thrust Collar
 - Seal
 - Needle Retainer
 - Cartridge Body
 - Use the reamer from the cleaning kit to remove any residual fluid from inside the cartridge body.



NOTE If your DV-7000 is configured with a precision needle, perform Steps 15 through 17. If the pump is configured with a Luer adapter and standard needle, skip to Step 18.

15. Flush the large end of the needle with MSDS-recommended cleaning solvent.

16. Insert the appropriate size tungsten wire into the needle to open a path through the end of the needle. Do not force the wire through the needle. If there is a hard plug, proceed as follows:
 - a. Use the drill bit supplied in the cleaning kit to remove the plug by gently rotating the bit by hand, being careful not to run the bit all the way through the needle.

**CAUTION!**

Do not run the drill bit all the way through the needle as this will increase the size of the needle opening.

- b. Once you have removed most of the material with the drill bit, try again to push the tungsten wire through the needle.
- c. If the wire still does not go through the needle, try again with the drill bit until you can get the wire all the way through the needle.



NOTE If great care is taken to maintain the needle, it should last indefinitely.

17. Once you have cleared a path through the needle, flush the needle with cleaning solvent until a clear stream of solvent flows from the end of the needle.
 - ▶ If necessary, use a small bottle brush to remove residual fluid. Rotating the bottle brush counterclockwise while slowly inserting it into the needle will pull out any residual fluid.
18. Inspect the seal and the lower bearing for wear and replace if worn.
19. Reassemble the cleaned cartridge as specified in “[Assembling a Dispensing Cartridge](#)” in the [Operation](#) section.
 - ▶ Load the cartridge as specified in “[Loading a Dispensing Cartridge](#)” in the [Operation](#) section.
20. Connect a new feed tube to the cartridge fitting.
21. Prime the pump as specified in “[Priming the Pump](#)” in the [Operation](#) section.

DV-8000

Tools and Materials Needed

- | | |
|-----------------------------------|---|
| • Cotton Swabs | • Appropriate Personal Protective Equipment |
| • Cleaning Kit (P/N 196196) | • Seal Insertion Tool Set (P/N 197004) |
| • 1/4-inch Wrench | • Cleaning Solution (MSDS recommended) |
| • Cartridge Fitting (P/N 42-0028) | • Elbow Fitting Kit (P/N 63-0064-00) |

To clean the DV-8000 Cartridge (see [Figure 5-2](#)):

1. Use the dispensing system position controls to move the dispensing head to the front and center of the dispensing area.
2. Perform a service shutdown as specified in the applicable dispensing system manual.
3. Open the dispensing system front doors/hatch and locate the pump on the dispensing head.
4. Remove the receiver head and unscrew the syringe from the 90-degree elbow fitting.
5. While holding onto the elbow fitting, pull the blue cartridge release lever to the side and rotate it forward towards the front of the pump.

6. Pull the dispensing cartridge out of the pump by gently pulling down on the nozzle.
7. Disconnect the 90-degree elbow fitting from the cartridge fitting.
8. Using a 1/4-inch wrench, unscrew the cartridge fitting from the cartridge.
9. Discard the cartridge fitting in accordance with MSDS recommendations.
10. While holding the cartridge body in one hand and the end of the feedscrew in the other, gently pull the feedscrew out of the body.
 - ▶ The thrust collar should remain attached to the feedscrew.
11. Using your fingers, remove the lower bearing from inside of the cartridge body.



NOTE If the cartridge does not have a seal, skip to Step 13.

12. Using a cotton swab, carefully remove the seal from inside of the cartridge body.
 - ▶ The seal is very fragile. If the seal is not damaged, it may be reused.
13. While holding the cartridge body, gently twist the needle retainer to remove it from the end of the cartridge.

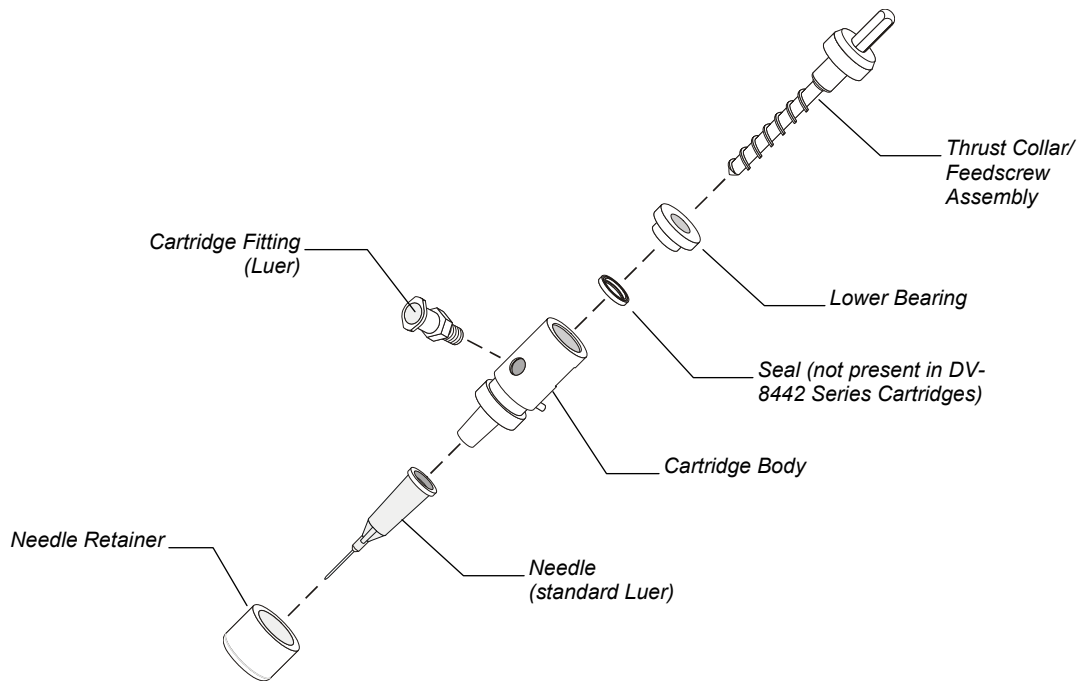


Figure 5-2 DV-8000 Cartridge Disassembly (typical)

14. Use MSDS recommended cleaning solution and a small bottle brush or cotton swab to thoroughly clean the following parts making sure all fluid and residue is removed:
 - Thrust Collar/Feedscrew
 - Lower Bearing
 - Seal (if present)
 - Needle Retainer
 - Cartridge Body



NOTE If your DV-8000 is configured with a precision needle, perform Steps 15 through 17. If your DV-8000 is configured with standard Luer needle, skip to Step 18.

15. Flush the large end of the needle with cleaning solvent.
16. Insert the appropriate size tungsten wire into the needle to open a path through the end of the needle. Do not force the wire through the needle. If there is a hard plug, proceed as follows:
 - a. Use the supplied drill bit to remove the plug by gently rotating the bit by hand, being careful not to run the bit all the way through the needle.

**CAUTION!**

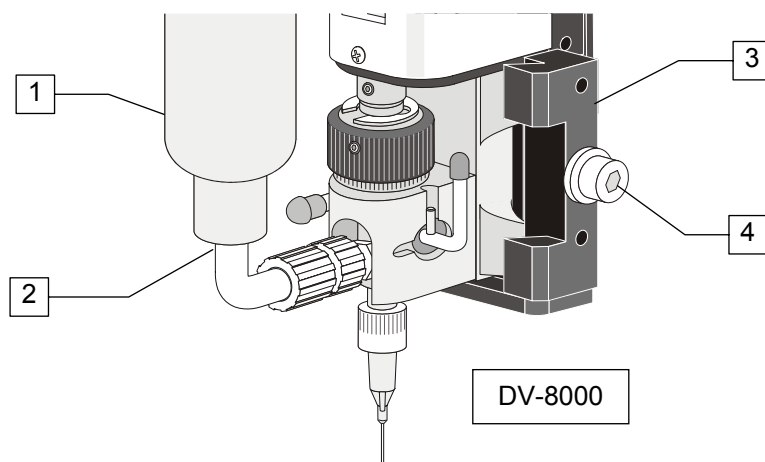
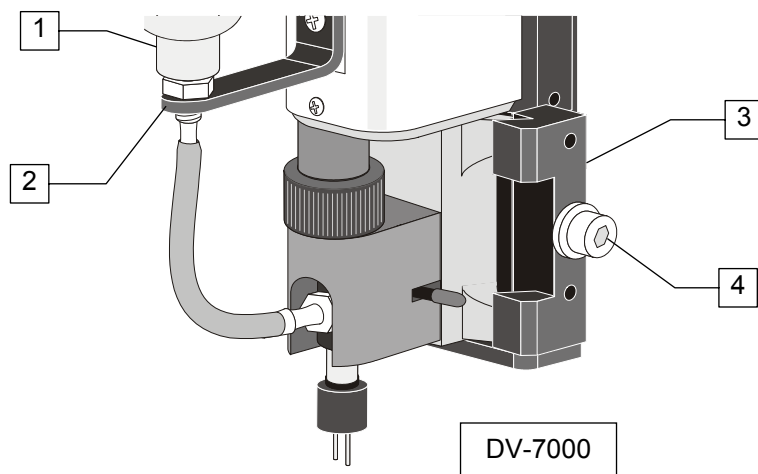
Do not run the drill bit all the way through the needle as this will increase the size of the needle opening.

- b. Once you have removed most of the material with the drill bit, try again to push the tungsten wire through the needle.
 - c. If the wire still does not go through the needle, try again with the drill bit until you can get the wire all the way through the needle.
17. Once you have cleared a path through the needle, flush the needle with cleaning solvent until a clear stream of solvent flows from the end of the needle.
 - If necessary, use the small bottle brush to remove any residual fluid. Rotating the bottle brush counterclockwise while slowly inserting it into the needle will pull out any residual fluid.
18. Inspect the seal and the lower bearing for wear. If they are worn, replace them.
19. Reassemble the cartridge as specified in “[Assembling a Dispensing Cartridge](#)” in the *Operation* section.
20. Install a new 90-degree elbow fitting onto the cartridge fitting.
21. Load the cartridge as specified in “[Loading a Dispensing Cartridge](#)” in the *Operation* section.
22. Prime the pump as specified in “[Priming the Pump](#)” in the *Operation* section.

Removing the Pump from the Dispensing System

To remove the pump for servicing (see Figure 5-3):

1. Using the position controls, move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown as specified in the applicable dispensing system manual.
3. Open the doors/hatch and locate the pump on the dispensing head.
4. Disconnect the following:
 - a. Syringe air hose from the fluid syringe
 - b. Power cords for the pump and height sensor (if present) from the dispensing head bulkhead
5. Unscrew and remove the fluid syringe with the receiver head from the syringe fitting.
6. Use a 4 mm hex key to loosen the locking screw on the side of the valve bracket.
7. Carefully lift the pump out of the valve bracket and place it in a safe location for servicing.



Item	Description
1	Fluid Syringe
2	Syringe Fitting
3	Pump Bracket
4	Locking Screw

Figure 5-3 Removing the Pump for Service

Pump Assembly and Disassembly

Use the exploded diagrams and tools lists in the [Parts Replacement](#) section to help you disassemble and reassemble the pump. Contact Asymtek Technical Support if you have questions.



CAUTION!

Only trained service technicians should perform pump assembly and disassembly.

6 Troubleshooting

Overview

This section will help you determine the origin of problems you may experience with your pump and suggest the recommended corrective actions.

If you experience problems that are not listed in this section, or continue experiencing the problem after trying the suggested corrective actions, please contact Asymtek Technical Support for more advanced fault diagnostics.



TIP You may want to contact your nearest Asymtek Regional Support Center (RSC) for Dispensing system problems or problems that may be attributable to fluid selection, dispensing applications, or programming.

Safety First

Before troubleshooting a problem, please familiarize yourself with the important information provided in the [Safety](#) section.



WARNING!

Dispensing equipment in need of troubleshooting may have High Voltage present in both designated and unsuspected places. High Voltage can result in personal injury or death.



CAUTION!

Troubleshooting should only be performed by trained service technicians.

Troubleshooting the Pump

Basic troubleshooting and suggested recovery measures are presented in Table 6-1. Due to variances in production environment and operational conditions, not every possible problem can be addressed.



TIPS

To assist in the troubleshooting effort, you may want to review “[Theory of Operation](#)” in the [Operation](#).

To quickly identify problems, look for obvious signs such as burnt, missing, damaged, or loose parts as well as obstructions and spills. Obvious uncharacteristic heat, noise, vibration, odor, or movement can also help to isolate problems.

Table 6-1 Troubleshooting Guide

Symptom	Possible Cause	Recovery
Intermittent or no fluid dispensing	Pump poorly primed	See “ Priming the Pump ” in the Operation section.
	Clogged needle	Clean or replace the needle.
	Plugged pump	Clean Pump. See “ Cleaning the Pump ” in the Maintenance and Service section.
	Speed Control set to 0 rpm	See “ Pump Adjustments ” in the Operation section.
	No power to motor	Make sure that pump power cord is connected to the power outlet on the dispensing head.
	Fluid syringe is empty	See “ Installing/Changing a Fluid Syringe ” in the Operation section.
Needle repeatedly clogs with fluid	Fluid particles too big for needle size	Replace needle with a larger diameter needle.
	Needle bent or damaged	Replace needle.
	Fluid has exceeded pot life or fill has separated	See “ Installing/Changing a Fluid Syringe ” in the Operation section.
Material drips or drools continuously from dispensing tip	Pump poorly primed	See “ Priming the Pump ” in the Operation section.
	Wrong type of stopper in the syringe	Use zero draft (orange or yellow) stoppers in the syringe.
	Air inside syringe expands	Add a short reverse motor command to the end of the dispensing command. Refer to the <i>Fluidmove User Guide</i> or Online Help for instructions.
	Cartridge preload is improperly set (DV-8000)	See “ Loading a Dispensing Cartridge ” in the Operation section.
Inconsistent shot sizes	Syringe air pressure set too low	Increase syringe air pressure (30 psi max.). Refer to the applicable dispensing system <i>Operations Manual</i> for instructions.
	Drive mechanics do not have time to damp-out after an X-Y move	Increase the settling time in the Dot Parameters. Refer to the <i>Fluidmove User Guide</i> or Online Help for instructions.
	Feed screw damaged or binding	Contact Asymtek Technical Support.
Shots too large	Needle is too big	Replace needle with a smaller needle.
	Syringe air pressure set too high	Decrease syringe air pressure (30 psi max.). Refer to the applicable dispensing system <i>Operations Manual</i> for instructions.
Fluid flow rate too fast or too slow	Incorrect pump motor speed	Correct pump motor speed to rate recommended for the fluid used. Refer to the applicable dispensing system <i>Operations Manual</i> for instructions.
Pump is contacting other components during Dispensing Head movement	Incorrect Valve Bracket/Mounting Plate installation	Adjust bracket/plate height. Refer to the Installation section.

7 Specifications

Overview

The specifications below are intended as a convenient reference for personnel involved with installation, operation, and maintenance of the DV-7000 and DV-8000 Heli-Flow Pump.

Safety First

Familiarity with the performance specifications in this section can provide information leading to safe operation of the Pump. For additional safety information, refer to the [Safety](#) section.

Specifications

Table 7-1 contains the technical specifications for the DV-7000 and DV-8000 Pumps. If you have any questions about these specifications or pump performance, contact Asymtek Technical Support or your authorized distributor.



NOTE The specifications below are applicable to both the DV-7000 and the DV-8000 unless otherwise indicated.

Table 7-1 Pump Specifications

Parameter	Specification
Dimensions	
Length:	190 to 192 mm (7.48 to 7.56 inch)
Width:	33 mm (1.3 inch)
Depth:	72.6 mm (2.86 inch)
Weight (dry, without syringe):	362 g (0.8 pound)
Operating Voltage:	24 VDC
Operating Air Pressure (max):	
With Feed Tube:	275 kPa (40 psi, 2.75 bars)
With Elbow Fitting:	551 kPa (80 psi, 5.5 bars)
Syringe Sizes:	5, 10, 30, 74, or 177cc (0.17, 0.34, 1.0, 2.5, or 6.0 ounce)
Motor Type:	Closed-loop velocity control with encoder feedback
Maximum Tolerable Board Warpage: (DV-7000 only)	1.58 mm (0.06 inch)

8 Parts Replacement

Overview

This section contains information that will aid in assembling, disassembling, and ordering replacement parts for the DV-7000/DV-8000 Heli-Flow Pump.



NOTE Part number information is also available on Asymtek's Find-A-Part web page:
http://webstore.asymtek.com/awweblive/apps/findapart_index.asp

This section contains the following:

- [Parts Ordering Information](#)
- [Parts List/Exploded Views](#)
- [Unpacking and Inspecting Replacement Parts](#)
- [Cartridges](#)

Safety First

Before attempting to replace any parts, please review the precautions in the [Safety](#) section.



CAUTION!

Only trained service technicians should perform troubleshooting, servicing, and parts replacement.

Parts Ordering Information

Placing Your Order

Customers can order spare parts by contacting Asymtek Customer Service. Your Customer Service Representative can take your order or assist you in setting up an account to purchase spare parts through our Internet Web Store.

Warranty

Contact Asymtek Technical Support for any warranty issues pertaining to spare parts.

Return Material Authorization

Contact Asymtek Technical Support to obtain a Return Material Authorization (RMA) before returning any parts.

Unpacking and Inspecting Replacement Parts

Replacement parts are shipped to distributor or customer facilities in individual shipping cartons. Review the packing slip to ensure that the correct parts were received. Contact Asymtek Technical Support if any discrepancies are discovered.

Before unpacking your spare parts, visually inspect the carton for damage. If applicable, check the ShockWatch and the Tip N' Tell stickers for indications of improper shipping and handling. Inform the freight carrier of any damage.

Parts List/Exploded Views

DV-7000

Tables A-1 through A-3 list spare parts and supplies kits for the DV-7000. Figures A-1 to A-3 show the DV-7000 in exploded view. These illustrations can be helpful when ordering replacement parts for the pump.



NOTE Not all parts shown on the exploded views are available separately. Contact Asymtek Customer Service or your local distributor for availability.

Table 8-1 Recommended Spare Parts (DV-7000)

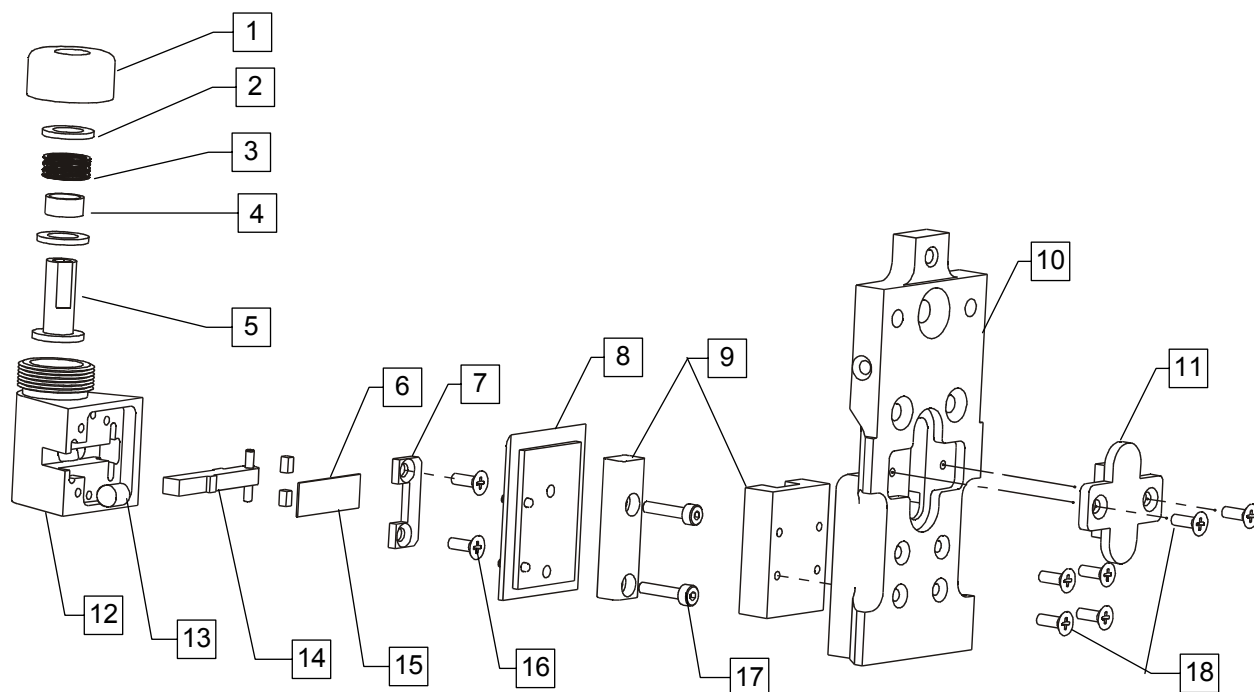
Part Number	Title
03-0684-00	Quick Release Lever Bearing
07-0017-00	Quick Release Lever Spring
40-0670	LM 25.8 Linear Bearing Guide
40-2667	7/32 X 0.158 Mini Joint Coupling
194577	Spring Thrust Pad
194578	Spring Guide
195360	1/4 ID, 3/8 OD Wave Spring

Table 8-2 Assembly and Adjustment Tools (DV-7000)

Part Number	Title
40-0042	Nutdriver, 1/4-inch
41-0002	Wrench, Hex, 4mm, T-Handle
41-0112	Wrench, Open End, 1/4 X 5/16
48-0036	Wrench, Allen, Hex, 2.5 mm
197004	DV-7000 Seal Insertion Tools

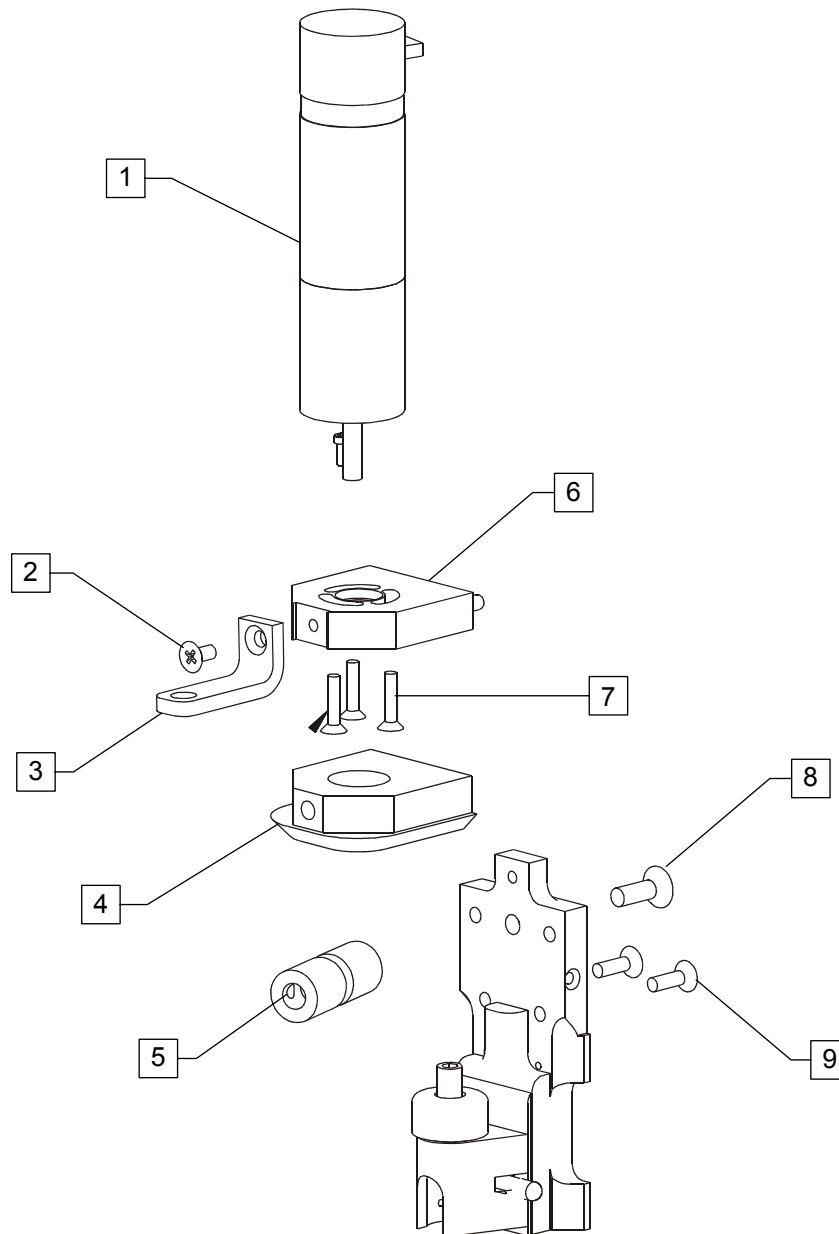
Table 8-3 List of Kits (DV-7000)

Part Number	Name	Application
NK-7000	Needle Kit	DV-7124-CF1, DV-7222-CF1
NK-01	Needle Kit	DV-7222-CL1
VK-7000	Valve Kit (includes Consumables Kit and Cleaning Kit)	DV-7124-CF1, DV-7222-CF1, DV-7222-CL1
SK-7000	Consumables Kit	DV-7124-CF1, DV-7222-CF1, DV-7222-CL1
VK-7000K	Cleaning Kit	DV-7124-CF1, DV-7222-CF1, DV-7222-CL1
SK-7001	Seal Kit	DV-7124-CF1, DV-7222-CF1, DV-7222-CL1



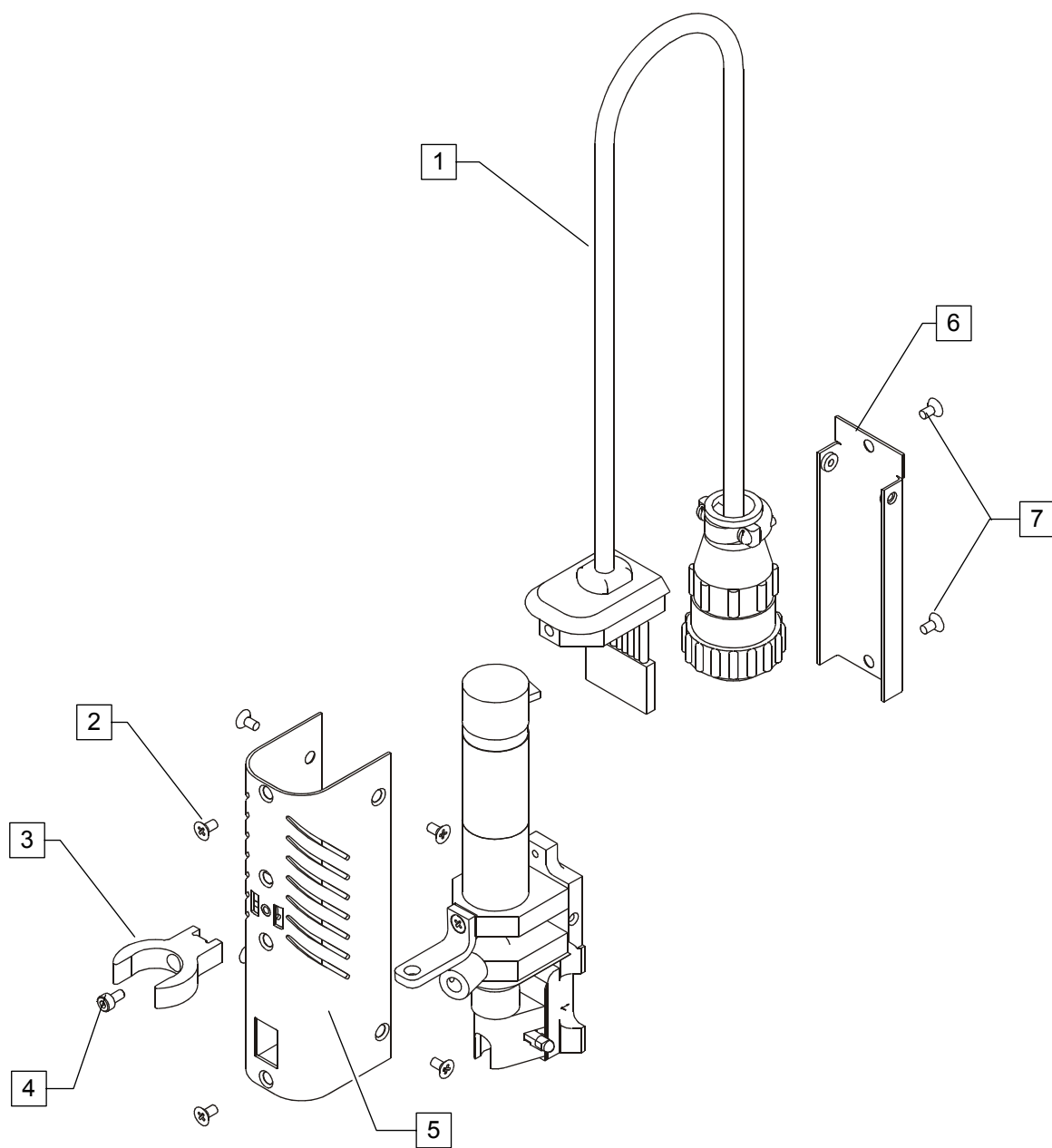
Item	Part No.	Description
1	194571	Cap, Valve Body
2	194577	Pad, Thrust Spring (X2)
3	195360	Spring, Wave, 3/8 OD, 1/4 ID
4	194578	Guide, Spring
5	194572	Coupling, Drive, Hex
6	07-0017-00	QR Spring
7	02-0092-00	Retainer, QR Bearing
8	03-0641-00	Plate, Slide Adapter
9	40-0670	Guide, LM Bearing, 25.8
10	03-0685-00	Back Plane
11	03-0873-00	Insert, Backplane
12	03-0630-00	Body, Valve
13	42-0997	Cap, Round, Vinyl, 0.109 ID, Blue
14	03-0682-00	Lever, QR
15	03-0684-00	Bearing, QR Lever (X2)
16	49-2206	Screw, M2 X 0.4 X 6 FLTHD, PH, REC
17	49-2310	SCHS, M2 X 0.4 X 10 mm
18	49-2206	Screw, M2 X 0.4 X 6 FLTHD, PH, REC

Figure 8-1 DV-7000 Exploded View (1 of 3)



Item	Part No.	Description
1	62-0434-00	Motor Assy w/ Encoder, 19:1
2	49-3206	Screw, M3 X 0.5 PH, Flat (6X)
3	02-0093-00	Bracket, Syringe
4	03-868-00	Cover, Base
5	40-2667	Coupling, Mini Joint, 7/32 X 0.158
6	03-0687-00	Bracket, Motor
7	49-9212	Screw, M2.5 X 12 mm Flat Head (3X)
8	49-4212	Screw, M4 X 0.7 PH, Flat X 12 mm
9	49-3210	Screw, M3 X 0.5 PH, Flat X 10 mm (X2)

Figure 8-2 DV-7000 Exploded View (2 of 3)



Item	Part No.	Description
1	06-0025-01	Cable Assy, DV-7000
2	49-3206	Screw, M3 X 0.5 PH, Flat (6X)
3	03-0638-00	Clip, Syringe, 10CC
4	49-3306	Screw, M3 X 0.5 X 6mm, Socket Cap
5	02-0094-00	Cover
6	02-0239-00	Cover, Back
7	49-3206	Screw, M3 X 0.5 PH, Flat (2X)

Figure 8-3 DV-7000 Exploded View (3 of 3)

DV-8000

Table 8-4 through Table 8-6 list spare parts and supplies kits for the DV-8000. Figure 8-4 through Figure 8-13 show the DV-8000 in exploded view. These illustrations can be helpful when ordering replacement parts for the pump.



NOTE

Not all parts shown on the exploded views are available separately. Contact Asymtek Customer Service or your local distributor for availability.

Table 8-4 Recommended Spare Parts (DV-8000)

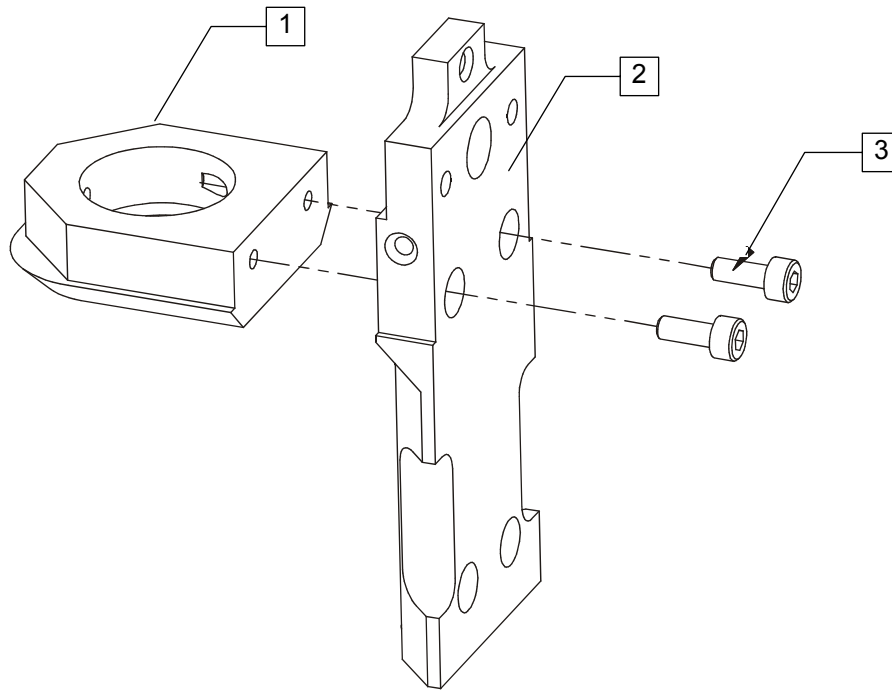
Part Number	Title
40-2667	7/32 X 0.158 Mini Joint Coupling
195850	Compression Spring, 0.18 OD, 0.014W, 0.38L
195851	6 ID X 12 OD Thrust Bearing

Table 8-5 Assembly and Adjustment Tools (DV-8000)

Part Number	Tool
40-0042	Nutdriver, 1/4-inch
41-0002	Wrench, Hex, 4mm, T-Handle
41-0112	Wrench, Open End, 1/4 X 5/16
48-0036	Wrench, Allen, Hex, 2.5 mm
197004	Seal Insertion Tools
198441	Torque Wrench, 14 mm 100 ounce-inch

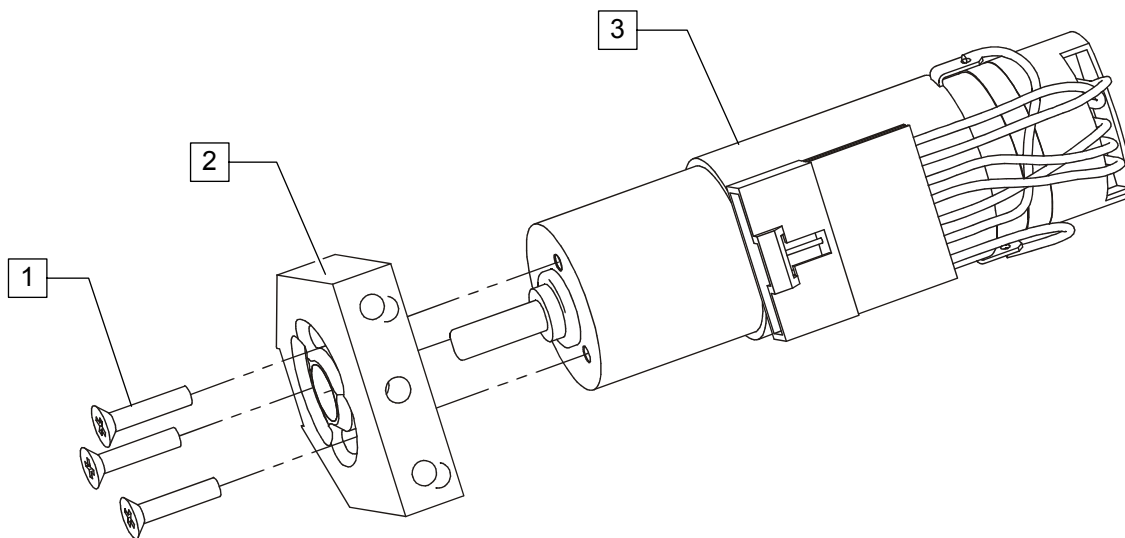
Table 8-6 List of Kits (DV-8000)

Part Number	Name	Application
NK-01	Needle Kit	DV-8222-CL1
NK-01 (+3 sleeves)	Needle Kit	DV-8321-CL8, DV-8322-CL8, DV-8331-CL8
42-0150 (1 box)	Needle Kit	DV-8442-CL9-04, DV-8442-CL9-19
VK-7000	Valve Kit (includes Consumables Kit and Cleaning Kit)	DV-8222-CL1
196197	Valve Kit (includes Consumables Kit and Cleaning Kit)	DV-8321-CL8, DV-8322-CL8, DV-8331-CL8
198554	Valve Kit (includes Consumables Kit and Cleaning Kit)	DV-8442-CL9-04, DV-8442-CL9-19
SK-7000	Consumables Kit	DV-8222-CL1
196194	Consumables Kit	DV-8321-CL8, DV-8322-CL8, DV-8331-CL8
198555	Consumables Kit	DV-8442-CL9-04, DV-8442-CL9-19
VK-7000K	Cleaning Kit	DV-8222-CL1
196196	Cleaning Kit	DV-8321-CL8, DV-8322-CL8, DV-8331-CL8, DV-8442-CL9-04, DV-8442-CL9-19
SK-7001	Seal Kit	DV-8222-CL1, DV-8321-CL8, DV-8322-CL8, DV-8331-CL8
196195	Spares Kit	DV-8321-CL8, DV-8322-CL8, DV-8331-CL8



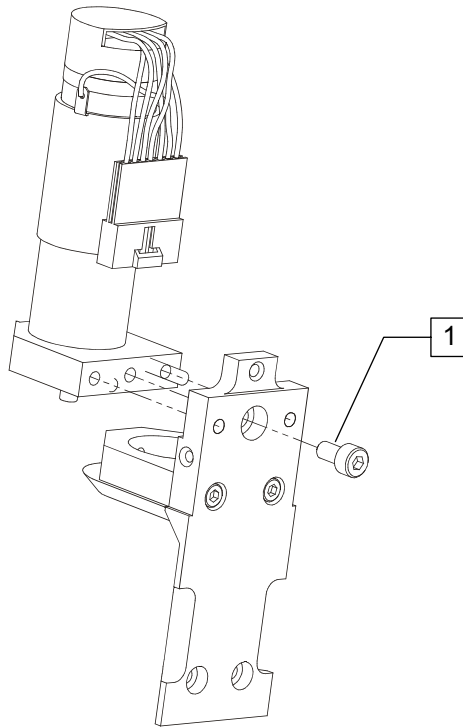
Item	Part No.	Description
1	195853	Cover, Lower Valve
2	195838	Back Plane, Valve
3	49-3308	Screw, M3 X 0.5 X 8 mm, Socket Cap (X2)

Figure 8-4 DV-8000 Exploded View (1 of 10)



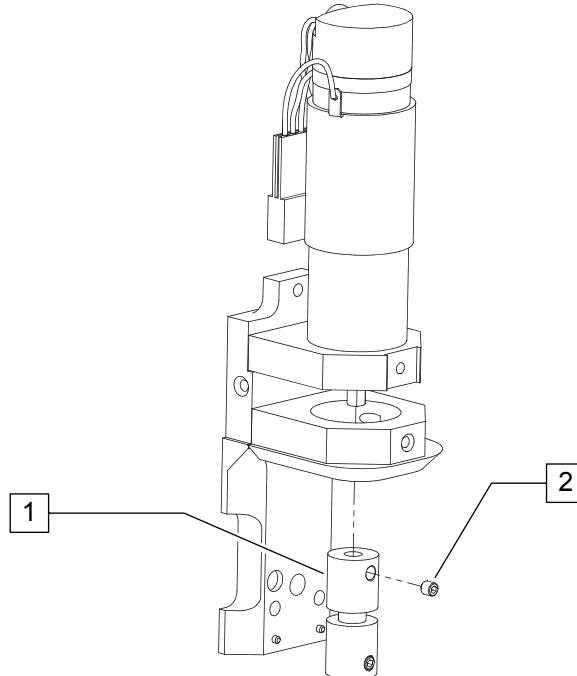
Item	Part No.	Description
1	49-9212	Screw, M2.5 X 12 mm Flat Head (3X)
2	03-0687-00	Bracket, Motor
3	197558	Motor Assy, 11 Watt w/ Encoder, 19:1
3	197559	Motor Assy, 11 Watt w/ Encoder, 4.4:1

Figure 8-5 DV-8000 Exploded View (2 of 10)



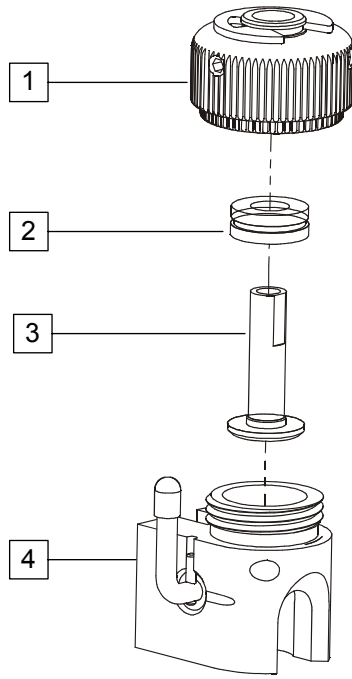
Item	Part No.	Description
1	49-4308	Screw, M4 X 0.7 X 8 mm, Socket Cap

Figure 8-6 DV-8000 Exploded View (3 of 10)



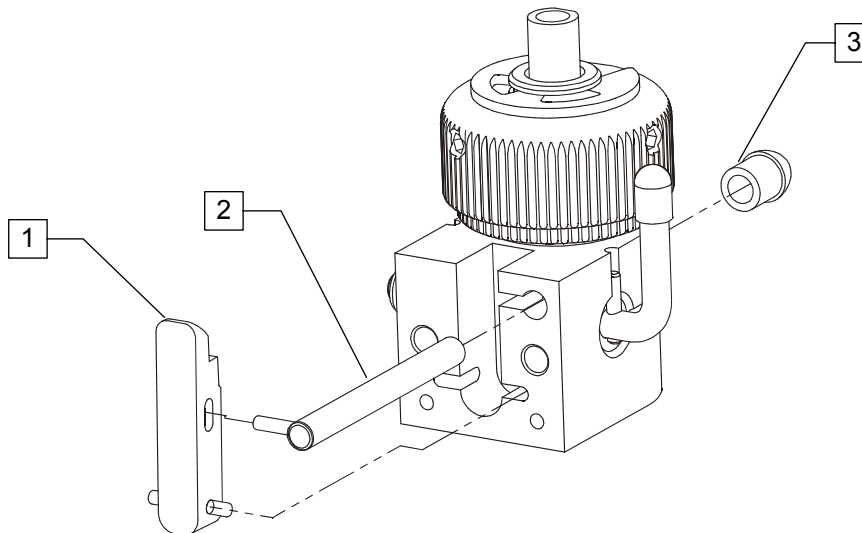
Item	Part No.	Description
1	40-2667	Coupling, Mini Joint, 7/32 X 0.158
2	--	Coupling Set Screw

Figure 8-7 DV-8000 Exploded View (4 of 10)



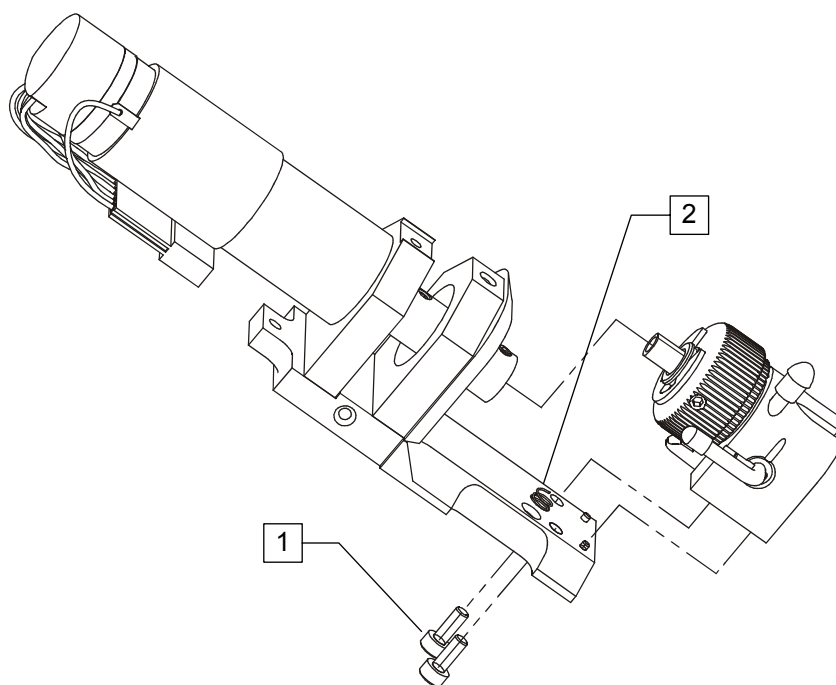
Item	Part No.	Description
1	197556	Assy, Clutch, Cap
2	195851	Bearing, Thrust, Ball, 6 ID X 12 OD
3	195844	Hex Coupler
4	197560	Assy, Body, Valve

Figure 8-8 DV-8000 Exploded View (5 of 10)



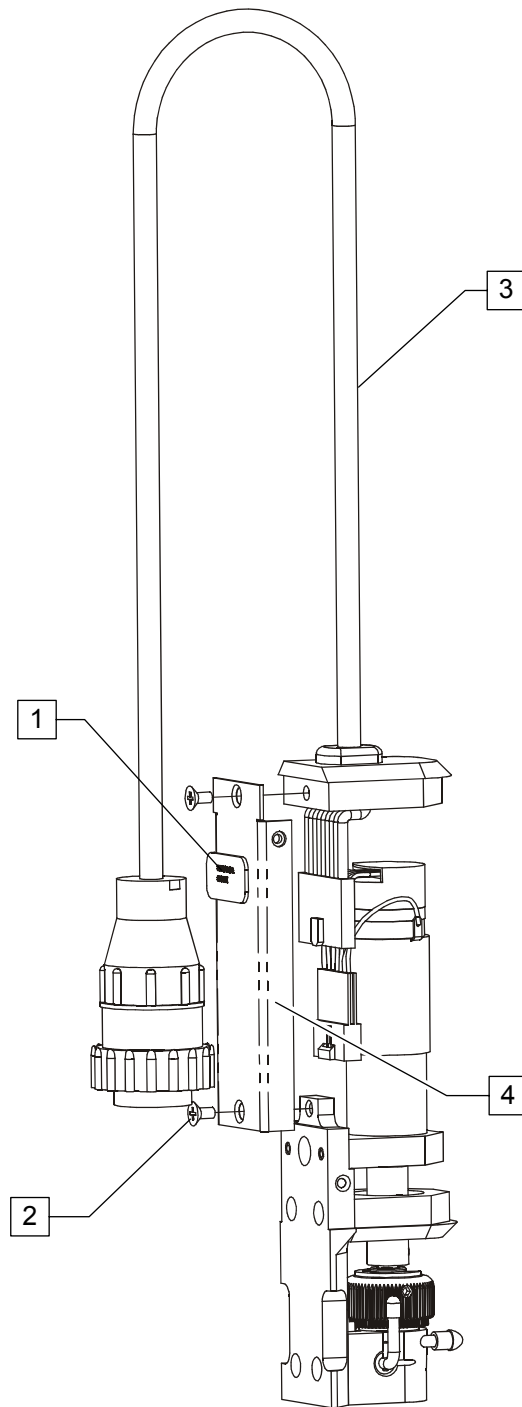
Item	Part No.	Description
1	195846	Lock, Cap, Valve
2	195847	Lock Release, Valve
3	198436	Cap, Vinyl, 0.125 ID, Red

Figure 8-9 DV-8000 Exploded View (6 of 10)



Item	Part No.	Description
1	49-3308	Screw, M3 X 0.5 X 8 mm, Socket Cap (X2)
2	195850	Spring, Comp, 0.18 OD, 0.14W, 0.38L

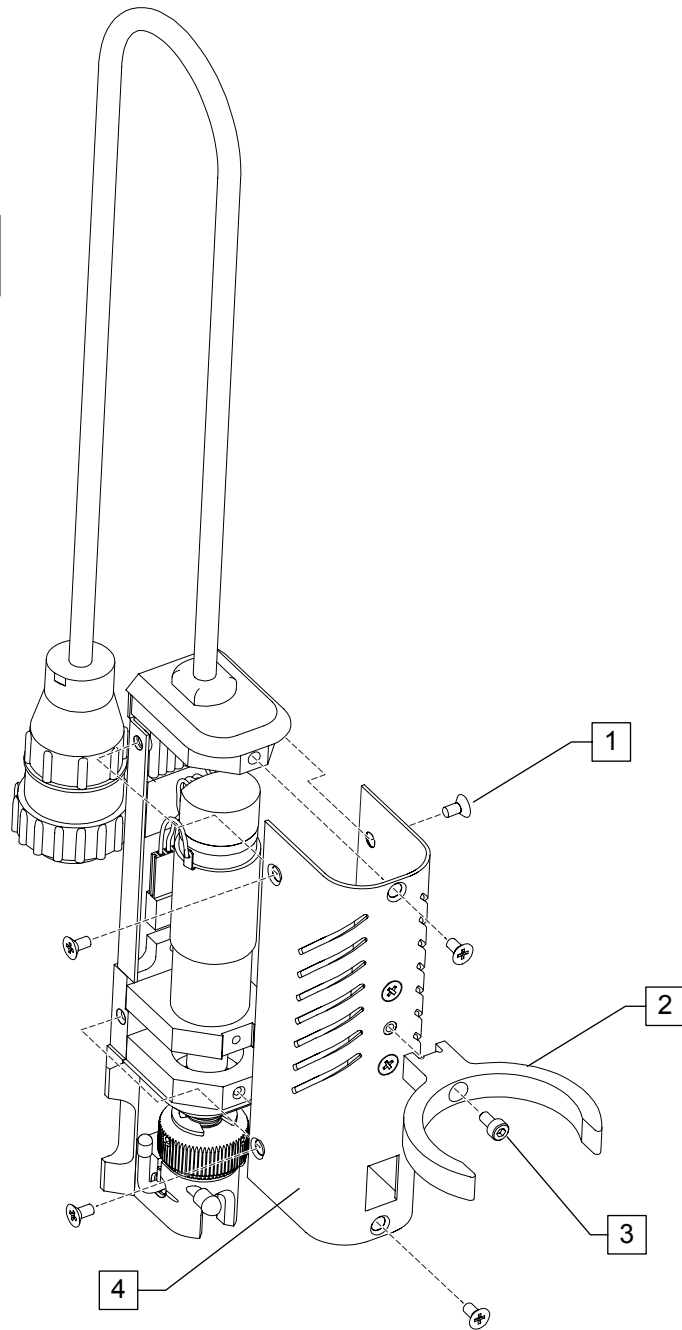
Figure 8-10 DV-8000 Exploded View (7 of 10)



Item	Part No.	Description
1	198439	Label, Serial Number, DV-8000
2	49-3206	Screw, M3 X 0.5 PH, Flat (2X)
3	198445	Cable Assy, DV-8000
4	02-0239-00	Cover, Back

Figure 8-11 DV-8000 Exploded View (8 of 10)

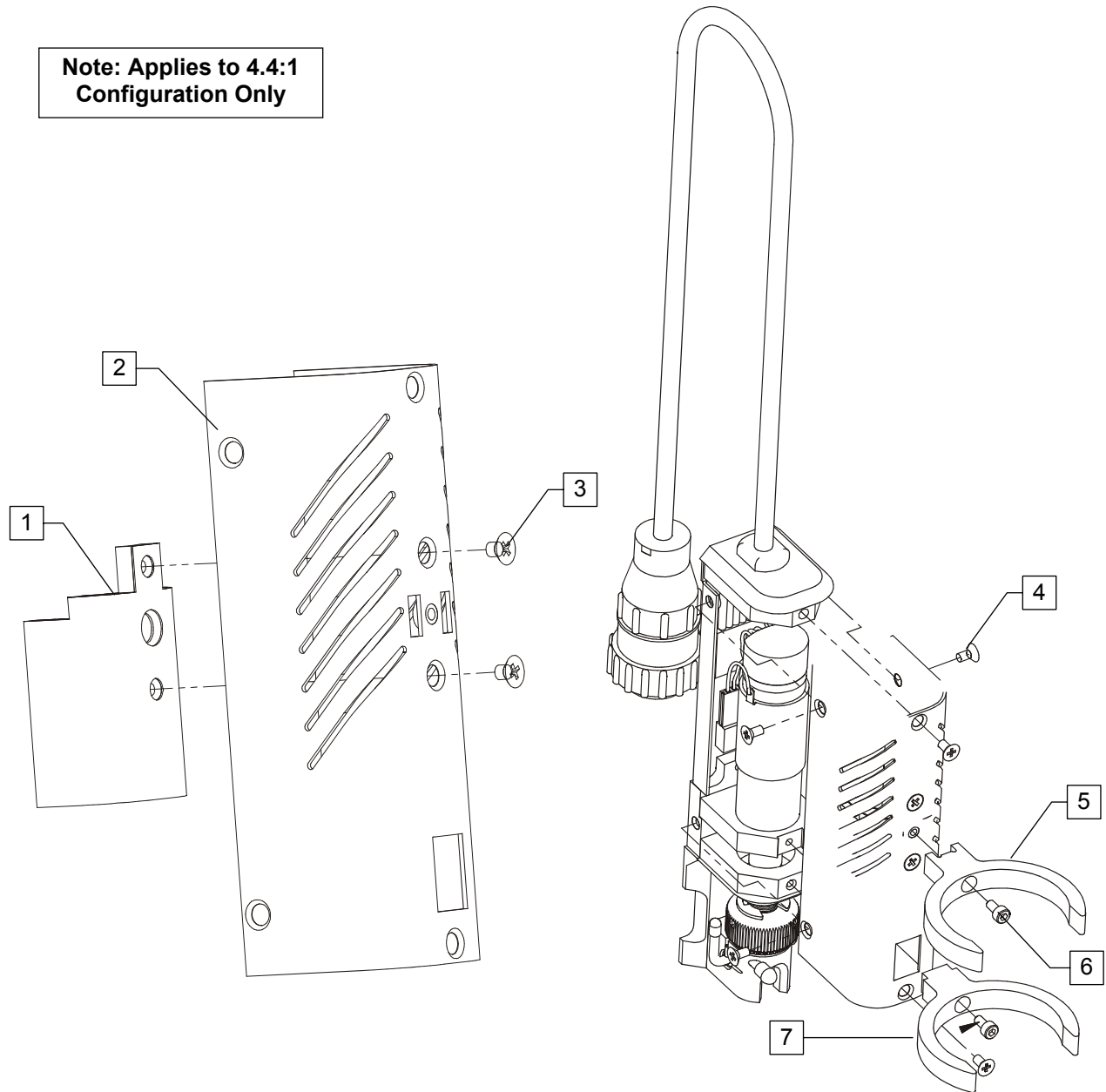
**Note: Applies to 19:1
Configuration Only**



Item	Part No.	Description
1	49-3206	Screw, M3 X 0.5 PH, Flat (6X)
2	03-0639-00	Clip, Syringe, 30 cc
3	49-3308	Screw, M3 X 0.5 X 8 mm, Socket Cap
4	02-0094-00	Cover

Figure 8-12 DV-8000 Exploded View (9 of 10)

**Note: Applies to 4.4:1
Configuration Only**



Item	Part No.	Description
1	198440	Assy, Heat Sink, DV-8000-04
2	02-0094-00	Cover
3	49-3204	Screw, M3 X 0.5 X 4 mm, PH, Flat M/S, S/S (X2)
4	49-3206	Screw, M3 X 0.5 PH, Flat (6X)
5	193227	Clip, 6 oz, Upper
6	49-3308	Screw, M3 X 0.5 X 8 mm, Socket Cap (2X)
7	193226	Clip, 6 oz/2.5 oz, Lower

Figure 8-13 DV-8000 Exploded View (10 of 10)

Cartridges

Table C-1 lists the Dispensing Cartridge assemblies available. Contact Asymtek Customer Service or your local distributor for the latest information.

Table A-1 List of Cartridge Assemblies

Part Number	Title	Pump Configuration
195354	Assembly, Cartridge/Screw, X331-CL8	DV-8331-CL8
195355	Assembly, Cartridge/Screw, X322-CL8	DV-8322-CL8
195356	Assembly, Cartridge/Screw, X321-CL8	DV-8321-CL8
196124	Assembly, Cartridge/Screw, X442-CL9	DV-8442-CL9-04/-19
196422	Assembly, Cartridge/Screw, X124-CP1	DV-7124-CP1
392554	Assembly, Cartridge/Screw, X222-CL1	DV-7222-CL1, DV-8222-CL1
392556	Assembly, Cartridge/Screw, X222-CP1	DV-7222-CP-1



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